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BRISTOL.



CALENDAR FOR THE SESSION

1889-90.

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# UNIVERSITY COLLEGE, BRISTOL.



## CALENDAR FOR THE SESSION 1889-90.

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BRISTOL:  
ARROWSMITH, PRINTER, QUAY STREET.  
1889.

1866  
12/4/1890  
UNIVERSITY COLLEGE, BRISTOL.

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THE College supplies for persons of either sex above the ordinary school age the means of continuing their studies in Science, Languages, History, and Literature; and particularly affords appropriate instruction in those branches of Applied Science which are more nearly connected with the arts and manufactures. A course of instruction has been arranged for students intending to become Engineers, Surveyors, or Architects. Special attention is given to class teaching and laboratory work.

The wants of teachers, clerks, artisans, and others, who are employed during the day, are supplied by Evening Classes and courses of Lectures, to which admission may be obtained at low fees.

Medical education is provided by the Bristol Medical School, which is affiliated to the College.

Arrangements for students who may desire to live with a family have been made with residents near the College. For a list of Professors and others who are thus willing to receive students into their houses during the College Session, and for information with regard to terms, etc., application should



be made to the Secretary, from whom information respecting lodgings for students may also be obtained.

Mrs. Lloyd Morgan will attend at the College at the beginning of the Session for the purpose of affording such advice as may be required, and of giving information with regard to homes where women students can be received.

The Calendar is published at the end of the third Term in each year. When necessary, a Supplement is published in October, containing the results of the examination held at the end of the third Term, and an account of such changes as take place during the vacation. This is to be had gratis, on application to the Secretary.

All inquiries and applications for admission to any of the classes must be made at the College in Tyndall's Park.

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BRISTOL MEDICAL SCHOOL.

# University College, Bristol—Calendar. 1889-90.

SEPTEMBER, 1889.		
3	College of Preceptors' Examination (Professional Preliminary) begins.	Tu
11	Meeting of Local Executive Committee, 4.15 p.m. Foundation of Bristol Medical School, 1828.	W
OCTOBER.		
1	Winter Session of Medical School begins.	Tu
1	Admission of Medical Students.	Tu
7	First Section of Permanent Buildings in Tyndall's Park opened in 1880.	
7	Admission of Day Students begins, and continues daily, 10 to 1 o'clock.	M
8	Opening Address, by the Rev. Canon Ainger, M.A., LL.D., at 8 p.m., in the Lecture Room of the Bristol Museum and Library.	Tu
9	Meeting of Local Executive Committee, 4.15 p.m.	W
9	First (or Winter) Term begins.	W
9	Admission of Evening Students begins, 6.30 to 8.30 p.m.	W
10	First Session of the College opened, 1876, in temporary premises.	
11	Meeting of Educational Board, 5 p.m.	F
21	B.Sc. Examination of the University of London begins.	M
27	Address to Students by the Very Rev. Dr. Stanley, Dean of Westminster, 1877.	
28	B.A. Examination of the University of London begins.	M
28	M.B. Examination of the University of London begins.	M
NOVEMBER.		
5	Address to Members of Bristol University College Club by Sir John Lubbock, Bart., M.P., 1883.	
8	Meeting of Educational Board, 5 p.m.	F
13	Meeting of Local Executive Committee, 4.15 p.m.	W
20	Meeting of Council, 2.30 p.m.	W
20	Annual Ordinary General Meeting of Governors, 4.30 p.m.	W
DECEMBER.		
3	College of Preceptors' Examination (Pupils) begins.	Tu
6	Meeting of Educational Board, 5 p.m.	F
11	Meeting of Local Executive Committee, 4.15 p.m.	W
16	First Term Examinations begin.	M
21	First Term ends.	S

## Calendar, 1890.

JANUARY—1890.		
13	Matriculation Examination of the University of London begins	M
15	Address to Students by the Right Hon. G. J. Goshen, M.P., 1879.	
15	Second Section of Permanent Buildings opened in 1883.	
16	Address to Students by Dr. William B. Carpenter, C.B., 1880.	
21	Second (or Spring) Term begins.	Tu
24	Preliminary Scientific (M.B.) Examination of the University of London begins. (Pass.)	F
FEBRUARY.		
7	Meeting of Educational Board, 5 p.m.	F
12	Meeting of Local Executive Committee, 4.15 p.m.	W
19	Meeting of Council, 2.30 p.m.	W
22	Candidates for Honour Certificates in Inorganic Chemistry and Engineering to send in their names to the Secretary.	S
MARCH.		
4	College of Preceptors' Examination (Professional Preliminary) begins.	Tu
7	Meeting of Educational Board, 5 p.m.	F
8	Lecture for the Students' Endowment Fund, by Mr. Matthew Arnold, 1888.	
12	Meeting of Local Executive Committee, 4.15 p.m.	W
15	Candidates for Examinations of Science and Art Department to send in their names to the Secretary.	S
20	Lecture for the Students' Endowment Fund, by Professor Max Müller, 1889.	
25	Address to Members of Bristol University College Club by the Right Hon. Sir Lyon Playfair, K.C.B., M.P., 1885.	
28	Second Term Examinations begin.	F
31	Winter Session of the Medical School ends.	M
APRIL.		
3	Second Term ends.	Th
5	Candidates for Whitworth Scholarships to send in their names to the Secretary.	S
29	Third (or Summer) Term begins.	Tu
MAY.		
1	Summer Session of Medical School begins.	Th
1	Admission of Medical Students.	Th
9	Meeting of Educational Board, 5 p.m.	F
14	Meeting of Local Executive Committee, 4.15 p.m.	W
17	Candidates for Honour Certificates (except in the subjects of Inorganic Chemistry and Engineering) to send in their names to the Secretary.	S
21	Meeting of Council, 2.30 p.m.	W
26	Address to Members of Bristol University College Club by the Right Hon. Lord George Hamilton, M.P., 1886.	
26	Monday in Whitsun Week	} College closed.
27	Tuesday in Whitsun Week	

## Calendar, 1890.

JUNE.		
2	M.A. Examination (Branch I.) of the University of London begins.	M
6	Meeting of Educational Board, 5 p.m.	F
7	Candidates for Gilchrist Scholarships to send in their names to the Dean of the College.	S
9	M.A. Examination (Branch II.) of the University of London begins.	M
9	Matriculation Examination of the University of London, held in the College, begins.	M
10	College of Preceptors' Examination (Pupils) begins.	Tu
11	Meeting of the Local Executive Committee, 4.15 p.m.	W
11	Public Meeting held to promote the establishment of the College, 1874.	
14	Candidates for the College, Catherine Winkworth, John Stewart, and Evening Class Scholarships, to send in their names to the Secretary.	S
16	M.A. Examination (Branch III.) of the University of London begins.	M
20	Third Term Examinations begin.	F
23	M.A. Examination (Branch IV.) of the University of London begins.	M
26	Third Term ends.	Th
27	Scholarship Examinations begin.	F
JULY.		
14	Intermediate Examination in Medicine of the University of London begins.	M
21	Intermediate Examination in Arts of the University of London begins.	M
21	Intermediate Examination in Science of the University of London begins.	M
21	Preliminary Scientific (M.B.) Examination of the University of London begins. (Pass and Honours.)	M
31	Summer Session of Medical School ends.	Th
AUGUST.		
9	College Incorporated, 1876.	



# UNIVERSITY COLLEGE, BRISTOL.

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ESTABLISHED '1876.

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Calendar for the Session 1889-90.

## GOVERNORS OF THE COLLEGE.

- (1) All Donors of £50 and upwards, *for life*; and all Annual Subscribers of £5 and upwards, *during subscription*.
- (2) Nominees of Corporate bodies or Associations, who are Donors of £250 or upwards, *in perpetuity*; or Annual Subscribers of £10 or upwards, *during subscription*.
- (3) Certain Official and Representative Persons.

Eleven Members of the Council are elected by the Governors.

All Governors are entitled to vote on the following scale :

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500	20	100	10	.....	2
1000	50	250	25	.....	3
2000	100	500	50	.....	4
3000	150	750	75	.....	5
4000	200	1000	100	.....	6

**PRESIDENT.**

THE VERY REV. GILBERT ELLIOT, D.D., DEAN OF BRISTOL.

**DEAN OF THE COLLEGE.**

PROF. C. LLOYD MORGAN.

**COUNCIL.**

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 PHILIP J. WORSLEY, B.A. (4)

(1) Elected by the Governors of the College. (2) Nominated by the Vice-Chancellor of the University of Oxford. (3) Nominated by the Vice-Chancellor of the University of Cambridge. (4) Nominated by the Vice-Chancellor of the University of London. (5) Nominated by the Lord President of the Privy Council. (6) Nominated by Balliol College, Oxford. (7) Nominated by New College, Oxford. (8) Nominated by the Dean and Professors of the College. (9) Nominated by the Bristol Medical School. (10) *Ex-officio* a Member of the Council. (11) Nominated by the Worshipful the Clothworkers' Company.

**SECRETARY.**

JAMES RAFTER.

**BANKERS.**

Messrs. MILES, CAVE, BAILLIE, & Co., Bristol Old Bank.

## PROFESSORS AND LECTURERS.

Chemistry - - - - -	{	Professor, SYDNEY YOUNG, D.Sc. London. Lecturer and Demonstrator, ARTHUR RICHARDSON, Ph.D.
Mathematics - - - - -		Professor, D. C. SELMAN.
Experimental Physics - - - - -	{	Professor, J. RYAN, M.A., LL.M. Cam- bridge, D.Sc. London. Lecturer and Demonstrator, LLEWELYN N. TYACK.
Engineering - - - - -	{	Professor, J. RYAN, M.A., LL.M., D.Sc. Lecturer, D. C. SELMAN, A.M.I.C.E. Workshop Demonstrator, ALFRED E. MACKETT.
Geology, Biology, and Zoology - - - - -	{	Professor, C. LLOYD MORGAN, Dean of the College.
Botany - - - - -		Professor, A. LEIPNER.
Modern History and English Literature	{	Professor, JAMES ROWLEY, M.A., Trinity College, Dublin. Lecturer,
Greek and Latin - - - - -	{	Professor, R. FANSHAWE, M.A., late Fellow of New College, Oxford. Lecturer, FRANCIS BROOKS, M.A. Oxford.
Hebrew - - - - -		Lecturer, BERNHARD HEYMANN.
French - - - - -	{	Lecturers, EUGÈNE PELLISSIER, M.A., LL.B., B.Sc. A. D'OURSAY, B.A.
German - - - - -		Lecturer, A. LEIPNER.
Harmony and Counter- point - - - - -	{	Lecturer, CEDRIC BUCKNALL, Mus. Bac., Oxon.



## SCHOLARSHIPS TENABLE AT THE COLLEGE.

## GILCHRIST SCHOLARSHIPS.

*Secretary to the Gilchrist Educational Trust :*

HENRY A. PAPPS, Esq.,

4 The Sanctuary, Westminster, S.W.

*Conditions for Scholarships instituted by the Gilchrist Educational Trust in connection with University College, Bristol.*

A Scholarship of the value of £50 per annum, tenable for Three Years, will be annually awarded, by competitive Examinations, under the following conditions :

1.—Every candidate must apply to the Dean of University College, Bristol, before Saturday, 7th June, and submit to him a certificate of age and satisfactory testimonials to character.

2.—Every candidate must have completed his *sixteenth* year, and his age on the day of election must not exceed *eighteen* years.

3.—Candidates approved by the Dean shall present themselves at the Midsummer Matriculation Examination of the University of London; and the Scholarship of £50 shall be awarded to the candidate who shall stand highest at that Examination, provided that he pass in the *Honours* Division.

4.—Every Scholar shall attend in each year at least three Courses of Lectures, to be selected by himself, in University College, Bristol, provided that the total number of lectures in such courses averages twelve lectures per week throughout the Session. But if permitted by the authorities of the College, he may spend his third year at some other College.

5.—Every Scholar shall present, on his applying for each half-yearly instalment of his Scholarship (which will be payable on the 1st of January and the 1st of July), a certificate from the Dean of University College, Bristol, that his conduct has been good, and that he is pursuing his studies with a view to graduation in the University of London in one of the following Faculties: Arts, Laws, Science, or Medicine.

6.—Every Scholar shall be required to present himself at the Intermediate Examination in one of the above-named Faculties of the University of London, at an interval of not more than two academical years from his election, unless excused from doing so by the Gilchrist Trustees; and if he do not so present himself (unless by permission of the Trustees), or if he fail to pass the Examination, he shall be considered as having forfeited his claim to the remaining instalments of his Scholarship.

NOTE. (1) These Scholarships are open to Women.

(2) Half a day of Laboratory Work will be taken as equivalent to a Lecture.

(3) Gilchrist Scholars are not permitted to hold any other Scholarship tenable at the College.

#### COLLEGE SCHOLARSHIPS.

The following College Scholarships will be competed for in July, 1890:

One Chemical Scholarship of the value of £25, tenable for one year; open to men and women.

One Engineering Scholarship of the value of £25, tenable for one year; open to men. (See also p. 95.)

The subjects of Examination will be:

CHEMISTRY (including Laboratory Work).

ARITHMETIC.

EUCLID.

ALGEBRA.

TRIGONOMETRY.

CONICS (Geometrical and Analytical).

DIFFERENTIAL AND INTEGRAL CALCULUS.

MECHANICS AND ENGINEERING.

GEOMETRICAL DRAWING (Plane and Solid).

MACHINE CONSTRUCTION AND DRAWING.

HEAT, SOUND, AND LIGHT.

ELECTRICITY AND MAGNETISM.

PHYSICAL GEOLOGY AND GEOGRAPHY.

STRATIGRAPHICAL GEOLOGY AND PALÆONTOLOGY.

ZOOLOGY AND ANIMAL BIOLOGY.

BOTANY (Structural and Physiological).

POLITICAL ECONOMY.

LOGIC.

MORAL PHILOSOPHY.

ENGLISH HISTORY, from the beginning of the Danish inroads till the completion of the Norman conquest (787-1070).

ENGLISH LITERATURE. The Prose and Non-Dramatic Poetry of England, from the death of Dryden till the death of Johnson (1700-1784).

GREEK LANGUAGE, LITERATURE, AND HISTORY.

LATIN LANGUAGE, LITERATURE, AND HISTORY.

FRENCH LANGUAGE AND LITERATURE.

GERMAN LANGUAGE AND LITERATURE.

Candidates will be allowed to enter in as many of the above subjects as they choose. Twenty per cent. of the maximum marks in each subject will be deducted from the marks obtained by each candidate before adding them up to form the total of the candidate's marks. Information as to the full marks for each subject can be obtained on application to the Dean.

Candidates must send in their names and lists of subjects not later than Saturday, 14th June, to the Secretary.

The minimum age is fixed at sixteen. The successful candidates must be prepared to show certificates of birth, and give references if required.

The Chemical Scholarship will be awarded principally by the marks obtained in Chemistry; but in case the marks obtained in this subject by the best candidates are nearly equal, account will be taken of their marks in other subjects. The Chemical Scholar will in general be required to work in the Laboratory for five days a week during the Session.

The Engineering Scholarship will be awarded principally by the marks obtained in Arithmetic, Euclid, Algebra, Trigonometry, Conics, Differential and Integral Calculus, Mechanics and Engineering,

Electricity and Magnetism, and Geometrical and Machine Drawing. The Engineering Scholar will in general be required to attend one of the complete courses arranged for students in the Department of Engineering.

#### CATHERINE WINKWORTH SCHOLARSHIPS.

The Catherine Winkworth Scholarships were founded by subscriptions in memory of the late Catherine Winkworth, of Clifton. These Scholarships, which are tenable at the College, are awarded annually, and are competed for at the same time and under the same regulations as the College Scholarships (see above).

Two Scholarships, each of the value of £15, will be awarded in July, 1890. They are open only to women who have not held a Scholarship in the College for more than one year. Candidates must send in their names and lists of subjects not later than Saturday, 14th June, to the Secretary.

The Scholars will be required to attend at least two Courses of Lectures, in the day time, in each of the three terms of the Session.

#### JOHN STEWART SCHOLARSHIPS.

These Scholarships are awarded from the interest on the sum of £1000, bequeathed to the College by the late John Stewart, of Montpelier, Bristol. They are competed for at the same time and under the same regulations as the College Scholarships (see above).

Two Scholarships, each of the value of £20, tenable for one year, open to men and women, will be awarded in July, 1890. Candidates must send in their names and lists of subjects not later than Saturday, 14th June, to the Secretary.

The Scholars will be required to attend at least two Courses of Lectures, in the day time, in each of the three Terms of the Session.

**"HUGH CONWAY" SCHOLARSHIP.**

This Scholarship, founded to the memory of the late Frederick John Fergus (Hugh Conway), is intended to encourage the study of Literature, and especially of English Literature, in the city of Bristol and its immediate neighbourhood.

It will be awarded on the results of the Examination to be held at University College, Bristol, every fourth year, will be tenable for two years, and it will be of the annual value of about £40.

It will be open to such students of University College, Bristol, as may have lived in Bristol or its immediate neighbourhood for the three years, and attended the Day Classes and Lectures in English Literature, and the Day Classes and Lectures in Greek, Latin, French, German, or any one of them, during the entire Session immediately preceding the Examination.

Candidates will be examined in the period or periods of English literary history lectured upon, and the books or portions of books read at class in the day during the immediately preceding Session, supplemented by such additional material of study in the same subject as the Professor of English Literature may recommend and the Council of the College approve, together with one at least (but not more than two) of the following subjects: The Language and Literature of Greece, those of Rome, those of France, and those of Germany. To no one of these secondary subjects, however, shall a greater value be allowed at the Examination than one-half that assigned to the parts that are taken from the Literature of England.

The successful candidates will be required to attend the Day Lectures and Classes in English Literature, and in one at least of the secondary subjects specified above, and to pass with credit the Term Examinations in his principal and his secondary subject, in each of which he will have, as an essential condition of his keeping the Scholarship after the first year, to be

placed at least once during that year in the First Class. And to entitle him to receive payment of the Scholarship for the last half-year, and to describe himself afterwards as a "Hugh Conway Scholar," it will be necessary that he should obtain an Honour Certificate in English Literature at the end of the second year.

It will, however, be in the power of the Council of the College, on the recommendation of the Educational Board, to relax these conditions in the case of any Scholar who has been unable to observe them through sickness or other urgent cause.

Should the Scholarship on any one occasion fail to be taken, the Examination will be again held in the following year.

The Trustees of the Fund reserve the right to amend this scheme, or to substitute a fresh one, if they think fit.

The next Examination for the Scholarship will take place in 1893.

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The Examination for College, Catherine Winkworth, and John Stewart Scholarships will begin at ten o'clock on Friday, 27th June, 1890.

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#### **EVENING CLASS SCHOLARSHIPS.**

Two Scholarships, each of the value of £2 10s., will be awarded in July, 1890.

The subjects of Examination will be :

CHEMISTRY (Non-metals).

ARITHMETIC.

EUCLID (first three Books).

ALGEBRA (to Quadratic Equations).

TRIGONOMETRY (solution of Triangles).

APPLIED MECHANICS.

GEOMETRICAL DRAWING (Plane and Solid).

MACHINE CONSTRUCTION AND DRAWING.



HEAT, SOUND, AND LIGHT.

ELECTRICITY AND MAGNETISM.

PHYSICAL GEOLOGY AND GEOGRAPHY, with Stratigraphical Geology.

ENGLISH HISTORY, The Tudor Period (1485-1603).

ENGLISH LITERATURE, Cowley's Essays, Johnson's "London" and "The Vanity of Human Wishes," Rowe and Webb's "Selections from Tennyson."

GREEK LANGUAGE, LITERATURE, AND HISTORY.

LATIN LANGUAGE, LITERATURE, AND HISTORY.

FRENCH LANGUAGE, LITERATURE, AND HISTORY.

GERMAN LANGUAGE, LITERATURE, AND HISTORY.

Candidates will be allowed to enter in as many of the above subjects as they choose. Twenty per cent. of the maximum marks in each subject will be deducted from the marks obtained by each candidate before adding them up to form the total of the candidate's marks.

Candidates must send in their names and lists of subjects not later than Saturday, 14th June, to the Secretary.

The successful candidates must be prepared to give references if required.

The Examination will begin at seven o'clock on Friday, 27th June, 1890.

## ORDINARY CERTIFICATES.

Any student who diligently attends a course of instruction in any subject during a Session, and obtains a place in the first or second class in the examination at the end of the course, shall be entitled to receive a certificate from the College. Ordinary certificates are not, however, granted for Elementary Classes in Languages.

## HONOURS CERTIFICATES.

1. An *Honour Certificate* shall be granted, after examination by an External Examiner, in conjunction with the Professor or Lecturer of the subject, to any

student of the College who has diligently attended a course of instruction in any one of the subjects specified below, for three hours a week during three Terms, or two hours a week during four Terms:—

#### GROUP I.

INORGANIC CHEMISTRY.

ORGANIC CHEMISTRY.

PURE MATHEMATICS.

APPLIED MATHEMATICS.

ENGINEERING, PART I. (viz., the Theory of Structures, Geometrical Drawing, Surveying, and Levelling).

ENGINEERING, PART II. (viz., the Theory of Mechanism, Prime Movers, Machine Design and Drawing).

PHYSICS.

GEOLOGY.

ZOOLOGY.

BOTANY.

#### GROUP II.

POLITICAL ECONOMY.

LOGIC.

MORAL PHILOSOPHY.

#### GROUP III.

MODERN HISTORY.

ENGLISH LANGUAGE AND LITERATURE.

GREEK LANGUAGE AND LITERATURE.

LATIN LANGUAGE AND LITERATURE.

GREEK AND ROMAN HISTORY.

FRENCH LANGUAGE AND LITERATURE.

GERMAN LANGUAGE AND LITERATURE.

2. Candidates for Honour Certificates, before proceeding to examination, must obtain the consent of the Dean, who will provide them with a form of admission to the examination. These forms must be sent to the Secretary, with the fee for examination, on or before the 24th May, except in the case of candidates for certificates in Inorganic Chemistry and Engineering, whose forms must be sent in not later than the 25th February.

3. *Times of Examination.* The Examination for Certificates will in general be held at the end of June, except in Inorganic Chemistry and Engineering, in which subjects the Examination will be held at the end of March.

4. *Fees for Examination.* Each candidate shall pay 10/- for examination in each subject.

**ASSOCIATESHIPS.**

1. The title of Associate of University College, Bristol, will be conferred on all candidates who—

A. Shall have diligently attended an amount of instruction in the College equivalent to three courses of three hours a week each in each of three Terms during two Sessions; and shall have obtained a certificate of satisfactory conduct; and

B. Shall have obtained some one of the four following distinctions, namely—

- (i.) College Honour Certificates in four subjects, not more than three of which are in any one Group, provided that if three of them are in Group III. one of them be Latin;
- (ii.) A certificate, granted by the Examiners and approved by the Council, of having produced an essay or original investigation of exceptional merit, together with Honour Certificates in three subjects.
- (iii.) A degree in any University in the United Kingdom; or
- (iv.) Such distinction in the Oxford University Examination for Women, or the Cambridge University Higher Local Examination, as from time to time shall be considered sufficient.

NOTE.—For the present a class in Honours in each of two sections of the second part of the Oxford Examination will be considered sufficient; or a first-class in each of two of the four Groups B, C, D, E of the Cambridge Examination, and a second class in a third Group.

2. The title of Associate in Engineering shall be granted, on application, to all candidates who have complied with condition A, and who obtain an Honour Certificate in Engineering, Part I., and in Engineering, Part II., and in three of the subjects, Pure Mathematics, Applied Mathematics, Physics, Geology, and Chemistry; provided that one at least of his Certificates be in Pure or Applied Mathematics.

3. The title of Associate in Chemistry shall be granted, on application, to all candidates who have complied with condition A, and who obtain Honour Certificates in Inorganic and in Organic Chemistry, and in either Pure Mathematics or Physics; and who pass satisfactory examinations in Qualitative and Quantitative Analysis.

4. Associates shall be entitled to admission to such lectures and on such terms as the Council shall from time to time direct.

NOTE.—For the present they shall be admitted free to all Day Lectures, and to Laboratory Practice at half fees.

5. The Council may elect, on the recommendation of the Educational Board, former students of the College who, though not possessed of the foregoing qualifications, shall have distinguished themselves in Literature, Science, or Art, or in some career of public usefulness; provided that no person shall be so recommended within seven years after he has first entered as a student.

6. Every Associate shall hold his Associateship and enjoy its privileges subject to the rules and regulations for the time being in force in the College, and may be deprived of it by the Council on the recommendation of the Educational Board.

#### ASSOCIATES.

R. MARY ABBOT.

FRANKLEN P. EVANS.

Professor H. S. HELE SHAW.

DAVID M. DAVIES, M.D.

JOSEPH A. LEON, B.A.

A. WHARTON METCALFE (Engineering).

W. BARRETT ROUÉ, M.D.

KATHARINE I. WILLIAMS (Chemistry).

P. WATSON WILLIAMS, M.B.

ARTHUR RICHARDSON, Ph.D.

Professor D. C. SELMAN.

ARTHUR COLLIE, M.D.

MEDWIN C. CLUTTERBUCK, B.Sc.

NORMAN LEONARD, B.Sc.

WILLIAM E. TANNER, B.A.

ERNEST W. BURT, B.A.

**LIBRARY.**

The College Library, which has been gradually accumulating, is now being arranged, under the supervision of Professor Rowley, the Hon. Librarian, in one of the rooms of the College, so as to be available for use by the students.

**SUBSCRIPTION.**

Every student on entering his or her name will be invited to contribute a sum of 2/6 towards the maintenance and extension of the Library.

**DONATIONS.**

Valuable donations of books have been received from some of the leading publishing firms and from private individuals (see p. 143). All such donations will be gratefully acknowledged by the Hon. Librarian.

**REGULATIONS.**

1. The Library is open for the use of all students of the College. Past students will be allowed to make use of the Library, and to take out books by special permission, in each case, of the Librarian. Application for the loan of, or for reference to, books should be made either at the Secretary's office or at the Porter's room, where catalogues of the books contained in the Library may be consulted.

2. The books which are kept for loan must not be kept out beyond the specified number of days; but if no application has been made for the book, the student, by re-entering it, may retain the book for a further period.

3. The books which are kept for reference are on no account to be removed from the College premises, and must be returned immediately after the student has consulted them.

4. A receipt must in every case be signed by the student on receiving a book either for reference or loan.

5. In the case of an injury being done to any book, the student injuring it will be required to substitute another copy in its place.

6. All books must be returned to the Library on or before the last day of the Session.

### ENGINEERING SOCIETY.

The objects of this Society are the reading and discussion of papers contributed by its members, and the promotion of intercourse among them, on subjects connected with the Department of Engineering and the Constructive Professions; to organise excursions to various works in course of construction and visits to engineering establishments; to obtain from past students or others such information with regard to professional occupation which may be of assistance to members of this Society, either upon leaving the College, or at any future time. All students who are attending, or who have at any time attended, Engineering courses, are eligible as members; all other past and present students of the College are eligible as associates. A small annual subscription is payable by members and associates during their attendance at the College. Meetings, under the presidency of the Professor of Engineering, are held fortnightly during Term.

A large number of weekly technical journals are purchased by the Society. These may be used in the Reading Room during the day-time, and in the evening may be taken home by the members. (See Appendix, p. 159.)

### LOCKERS.

Lockers are provided in the cloak-rooms, for the use of students. at a charge of 1/- for one Term, or 2/6 for a Session. Each student will be required to deposit 1/- with the Secretary, to whom the key of the locker must be returned on or before the last day of the session. The deposit will be returned to the student when the key is given up, provided the locker is uninjured.

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### RAILWAY SEASON-TICKET ARRANGEMENTS.

Upon production of a certificate, signed by the Dean or the Secretary, that the bearer is a student of University College, Bristol, and under 18 years of age, the various Railway Companies will issue season tickets at half the usual rates.



## SESSION 1889-90.

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THE Session will be opened with an introductory Address by the Rev. Canon Ainger, M.A., LL.D., on Tuesday, the 8th of October, 1889, and will end on the 26th June, 1890.

The Session is divided into the following Terms:

First (or Winter) Term—

Commencement - Wednesday, 9th October, 1889.

Termination - - Saturday, 21st December, 1889.

Second (or Spring) Term—

Commencement - Tuesday, 21st January, 1890.

Termination - - Thursday, 3rd April, 1890.

Third (or Summer) Term—

Commencement - Tuesday, 29th April, 1890.

Termination - - Thursday, 26th June, 1890.

The College is closed on Whit-Monday and Whit-Tuesday, the 26th and 27th of May.

Examinations will be held at the following dates:

First Term - - 16th to 21st December.

Second Term - - 28th March to 3rd April.

Third Term - - 20th to 26th June.



SESSION 1889-90.



DAY LECTURES.

### GENERAL REGULATIONS.

(1.) Persons under the age of 16 years seeking admission as day students will be required to pass an entrance examination in English Grammar and Composition, and in Elementary Mathematics. This examination will in general be held on the first day of Term; but any candidate who desires to be admitted to it must give two days' notice.

(2.) The Dean will attend at the College for the purpose of admitting students at the beginning of each Term.

(3.) Every candidate for admission may be required to produce such testimonial of good character as shall be satisfactory to the Dean.

(4.) Every student, on admission, must sign an undertaking to observe all the regulations affecting students made by the Council of the College for the time being.

(5.) Every student must obtain a card of admission to the class which he enters. This is issued by the Secretary, on the presentation of a certificate signed by the Dean, and on payment of the fees. No student is entitled to attend the classes until he has complied with this regulation. The first lecture of every course will, however, be free.

(6.) A record will be kept of the attendance of students. A report of the attendance of any student will be periodically sent to his parents or guardians if they require it.

(7.) Any students of the College purposing to enter as candidates at any public examination shall obtain the consent of the Dean before giving in their names as entering from University College, Bristol.

(8.) Disorderly conduct on the part of any student will be reported to the Dean, who will adopt such action thereon as he may deem necessary.

(9.) Every student is required to provide himself with a College Calendar.

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*The Council reserve to themselves the power of suspending any class, if there is not a sufficient number of entries.*

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### **RULES OF COLLEGE DISCIPLINE.**

1. Students are required to behave in an orderly manner in all parts of the College building and grounds. Noisy behaviour in the students' cloak-room is especially forbidden.

2. All loitering in passages is forbidden, except when students are waiting for the opening of a lecture.

3. No smoking or carrying lighted pipes, &c., is permitted in the passages or about the entrances of the College.

4. Any wanton damage done to College property must be made good by the offender, and renders him liable to the undermentioned penalties.

5. The penalties attached to the breach of any of the above-mentioned rules are :

(1) A fine proportionate to the offence.

(2) Suspension or expulsion from the College in case of more serious or repeated offences.

### FEEES.

All fees are payable in advance.

The fees are, as a rule:—For a course of instruction of three or more hours a week, £5 5s. for three Terms, £4 4s. for two consecutive Terms, £3 3s. for the first or second Term singly, £2 2s. for the third Term. Some exceptions to this rule will be found in the statements of fees which are appended to the accounts given further on of the subjects of the several courses.

An entrance fee of 7s. is charged for each course; but all entrance fees for one Session may be compounded for by a single payment of a registration fee of £1 1s.

### GOVERNMENT AID TOWARDS THE INSTRUCTION OF SCIENCE TEACHERS.

In accordance with a minute adopted by the Right Honourable the Lords of the Committee of Her Majesty's Most Honourable Privy Council on Education, January, 1889 (Science Form, No. 722), their Lordships are prepared to pay three-fourths of the fees of teachers engaged in Science teaching selected to attend the undermentioned Day Classes, and one-half the fees of the teachers selected to attend the Evening Classes, on condition that satisfactory terminal reports of their progress and conduct be received, in the case of day students at the end of each of the three Terms into which the Session is divided, and in the case of evening students at the end of each of the first and second Terms.

Applications for this privilege must be made to the Secretary, Department of Science and Art, London, S.W.

The selection of the applicants will rest with the Department of Science and Art.



## I.—DAY CLASSES.

(a) *Chemistry*.—Any of the Lecture Classes not exceeding two in number. Laboratory instruction two days per week.

(b) *Physics*.—Lectures and Laboratory as above.

(c) *Engineering (Machine and Geometrical Drawing)*.—One or both of the classes.

(d) *Geology*.—The Lecture Class. Laboratory instruction two days per week.

(e) *Biology*.—One or both of the Lecture Classes. Laboratory instruction two days per week.

(f) *Botany*.—The Lecture Class.

## II.—EVENING CLASSES.

(a) *Chemistry*.—One or both of the classes.

(b) *Physics*.—Any of the Lecture Classes not exceeding two in number.

(c) *Geology*.—The Lecture Class.

(d) *Zoology*.—The Lecture Class.

(e) *Botany*.—The Lecture Class.

NOTE.—For details as to the payment of fees, &c., the minute should be consulted, copies of which may be obtained on application to the Secretary, Department of Science and Art, or may be seen at the Office of the College.

## DEPARTMENT OF ENGINEERING AND THE CONSTRUCTIVE PROFESSIONS.

Particulars with regard to the courses arranged for students intending to become civil, mechanical, mining, or electrical engineers, surveyors or architects, are set forth in the prospectus of this department, which will be found on a subsequent page.

## Day Lectures.

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### SUBJECTS OF INSTRUCTION.

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#### CHEMISTRY.

Professor SYDNEY YOUNG, D.Sc.

Lecturer and Demonstrator, ARTHUR RICHARDSON,  
Ph.D.

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JUNIOR CLASS. (FIRST YEAR.)

Wednesday and Friday, 11—12.

This course will be delivered during the first and second Terms.

INORGANIC CHEMISTRY.—NON-METALS.

#### *Principles of Chemistry.*

Nature of Matter—Elements—Compounds and Mixtures—Synthesis and Analysis—Laws of Chemical Combination—Atomic Weights—Nomenclature and Symbolic Notation—Principles of Classification.

#### *Non-Metals.*

The Non-Metals will be described in their order: their properties, and the properties of their compounds, and the relations subsisting between them, will be shown. The processes of manufacture of compounds of the Non-Metals used in the Arts will be described.

Text-books—Roscoe's *Elementary Lessons on Chemistry*; Thorpe's *Chemical Problems*.

This course covers the subject as prescribed for the Matriculation Examination of the University of London.

Fee for the course, £3 3s.

#### SENIOR CLASS. (SECOND YEAR.)

Monday, Wednesday, and Thursday, 9—10, and  
Saturday, 10—11.

This course will be delivered during the first and second Terms.

#### CHEMISTRY.—NON-METALS AND METALS.

The principles of Chemistry will be reconsidered more fully, and the Chemistry of the Non-Metals will be treated of in greater detail. The Metals and their compounds will be described, special attention being devoted to those of commercial importance. The Chemistry of the Carbon Compounds will, if time permit, be treated of shortly. Some lectures will be devoted to Crystallography and Spectrum Analysis.

Text-books.—Thorpe's *Inorganic Chemistry, Non-Metals and Metals*; Thorpe's *Chemical Problems*. To be consulted for reference—Roscoe and Schorlemmer's *Treatise on Chemistry*; Remsen's *Inorganic Chemistry*.

This course covers the subject as prescribed for the Preliminary Scientific (M.B.) and Intermediate Examination in Science of the University of London.

Fee for the course, £4 4s.

#### ADVANCED CLASS.

Saturday, 9—10.

The principles of Chemistry will be specially considered, comprising the Atomic Theory, Chemical Classification, the Periodic Law, Thermal Chemistry, Dissociation, the application of Physical methods to

the solution of Chemical Problems, and the Influence of Mass and Temperature on the progress of reactions.

Text-books.—Muir's *Principles of Chemistry*; Muir's *Thermal Chemistry*; L. Meyer's *Modern Theories of Chemistry*, translated by Bedson and Williams.

These lectures will be found suitable to students about to proceed to graduation in Chemistry.

Fee for the three Terms, £2 12s. 6d.; for two Terms, £2 2s.

### ORGANIC CHEMISTRY.—(CHEMISTRY OF THE CARBON COMPOUNDS.)

Professor, SYDNEY YOUNG, D.Sc.

This course will relate to the more important groups of the Compounds of Carbon.

Lectures will be given during the second Term on Tuesdays and Thursdays at ten o'clock; during the third Term on Mondays, Wednesdays, and Fridays at ten o'clock.

#### SYLLABUS.

History of the Chemistry of Carbon—Determination of the Composition of Carbon Compounds—Empirical and Rational formulæ—Classification—Hydrocarbons—Alcohols—Carbohydrates—Aldehydes and Ketones—Acids—Simple and Compound Ethers—Compound Ammonias—Characteristics of Aromatic substances—Benzene and its derivatives—Naphthalene and Anthracene and their derivatives—Pyridine, Chinoline, and their derivatives—Dyes—Alkaloids—Animal and Vegetable Educts.

So far as there is time and need, special attention will be devoted to the Paraffin Industry—Brewing and Distilling—Acetic Acid Manufacture—Soap Making and Candles—Sugar—Explosives—Artificial

## Colours and Dyes—The Alkaloids—Physiological Chemistry.

Text-books.—Armstrong's *Chemistry of the Carbon Compounds*. The following books are in the College Library, and may be consulted with advantage by the student:—Roscoe and Schorlemmer's *Organic Chemistry*; Schorlemmer's *Rise and Development of Organic Chemistry*; Watts's *Dictionary of Chemistry*; Remsen's *Organic Chemistry*.

This course covers the subject as prescribed for the Intermediate Examination in Medicine and the Final Examination in Science of the University of London.

Fee for the course, £3 3s.

## ANALYTICAL AND PRACTICAL CHEMISTRY.

### LABORATORY COURSES.

Professor, SYDNEY YOUNG, D.Sc.

Lecturer and Demonstrator, ARTHUR RICHARDSON, Ph.D.

The Laboratory is open daily, from 10 a.m. to 5 p.m., except on Saturdays, when it is closed. Instruction is given in the Laboratory on all branches of Practical Chemistry, including Qualitative and Quantitative Inorganic and Organic Analysis, the preparation of Chemical Products, and Inorganic and Organic Research. Special facilities will be afforded to those who desire to study Practical Chemistry as applied to the different processes employed in the Arts and Manufactures, and to Scouring, Bleaching, and Dyeing. The Laboratory will be under the immediate supervision of the Professor and of the Lecturer.

Laboratory work is required for the following Examinations:—Preliminary Scientific (M.B.), Intermediate Science and Intermediate Medicine Examinations of the University of London; and also for the B.Sc. Examination in Chemistry. Those proceeding for the Doctorate in Chemistry have special facilities for research, and will receive every help.

Each student will be required to provide, at his own expense, a set of ordinary apparatus, at a cost of from 10s. to 30s. Expensive apparatus, gas, fuel, water, and the ordinary reagents will be provided by the College. The cost of material for original research must be paid by the student.

Text-books.—For Junior Students: Thorpe's *Quantitative Analysis*; Jones's *Junior Course of Practical Chemistry*. For advanced Students: Fresenius's *Quantitative Analysis*; Crookes' *Select Processes*; Sutton's or Fleischer's *Volumetric Analysis*. A small library of chemical books is accessible at all times to students working in the Laboratory.

#### FEES IN GUINEAS—

	5 days a week.	4 days a week.	3 days a week.	2 days a week.	1 day a week.
For the Session ...	15	13	10	7½	5
„ two Terms ...	11	9	7½	5½	4
„ one Term ...	6	5	4	3	2
„ one Month ...	3	2½	2	1½	—

Students may, for convenience, arrange to divide their days of Laboratory work into half-days.

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#### ANALYTICAL COURSE.

Lecturer, ARTHUR RICHARDSON, Ph.D.

A course of lectures on the Principles of Qualitative Analysis will be given during the first and second Terms; it is intended to supplement the instruction in Practical Chemistry.

All first year's Laboratory Students are expected to attend this course.

The lectures will be given on Mondays at 10 a.m.

Fee, £1 1s. for the two Terms.

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#### CHEMICAL EXCURSIONS.

In order that students may have an opportunity of acquiring some knowledge of Applied Chemistry, excursions to some of the Mines and Manufactories



of the neighbourhood will occasionally be made. They will be conducted by the Professor or by the Lecturer. Past or present students of the College desirous of taking part in these excursions are invited to apply to the Professor of Chemistry.

## PHOTOGRAPHIC CHEMISTRY.

Lecturer, ARTHUR RICHARDSON, Ph.D.

Instruction will be given in the Photographic Laboratory in Dry-Plate Processes, Printing, Enlarging, and in Microscopical Photography, at times to be arranged with those who enter.

Students will be required to provide their own cameras. Dry plates, chemicals, &c., are provided.

Fee, £3 3s. for each Term.

NOTE.—If the number of entries is insufficient, the class will be discontinued.

## MATHEMATICS.

Professor, D. C. SELMAN.

There will be an Elementary, Intermediate, and Advanced Course, a Special Course for Women, and a Tutorial Class.

### ELEMENTARY COURSE.

Monday, Wednesday, and Friday, 12—I.

The lectures will comprise the following subjects:

Elementary and Higher Arithmetic. Logarithms. Euclid, books I.—IV., with Exercises. Mensuration. Elementary Algebra to end of Progressions. Elementary Trigonometry.

Students may attend the Tutorial Class on Wednesday afternoon.

This course meets the requirements of the Matriculation Examination of the University of London and the Examination of the College of Preceptors.

Text-books.—P. Goyne's *Higher Arithmetic*; W. Johnson's *Logarithms*; Hall and Stevens's *Euclid*; Hall and Knight's *Algebra*.

Fee, £5 5s. for three Terms; £4 4s. for two consecutive Terms; £3 3s. for the first or second Term singly; £2 2s. for the third Term.

### INTERMEDIATE COURSE.

Tuesday, Thursday, 11, and Friday, 10.

The lectures will comprise the following subjects: Algebra to end of Interest and Annuities. Euclid, books VI., XI., and Modern Geometry. Trigonometry to end of Solution of Triangles. Geometrical and Analytical Conics.

Students may attend the Tutorial Class on Wednesday afternoon.

This course meets the requirements of the Intermediate Examination in Arts and Science of the University of London.

Text-books.—Hall and Knight's *Higher Algebra*; Hall and Stevens's *Euclid*; Lock's *Trigonometry for Schools*; C. Taylor's *Geometry of Conics*; C. Smith's *Conic Sections*.

Fee, £5 5s. for three Terms; £4 4s. for two consecutive Term; £3 3s. for the first or second Term singly; £2 2s. for the third Term.

### ADVANCED COURSE.

Tuesday, Thursday, 10, and Friday, 11.

The lectures will comprise the following subjects:

Higher Algebra and Theory of Equations. Higher Trigonometry, Plane and Spherical. Conic Sections and Solid Geometry. Differential and Integral Calculus. Elementary Differential Equations. Analytical Statics and Rigid Dynamics.

During the first Term the lectures will be given on the Differential and Integral Calculus and Conics.

This course meets the requirements of the B.A. and B.Sc. Honours Examinations of the University of London.

Text-books.—Hall and Knight's *Higher Algebra*; Johnson's *Higher Trigonometry*; Todhunter's *Spherical Trigonometry*; C. Smith's *Conic Sections*; C. Smith's *Solid Geometry*; Edwards' *Differential Calculus*; Williamson's *Integral Calculus*.

Fee, £5 5s. for three Terms; £4 4s. for two consecutive Terms; £3 3s. for the first or second Term singly; £2 2s. for the third Term.

#### SPECIAL COURSE FOR WOMEN.

Monday, Wednesday, and Saturday, 11.

This course is intended to meet the requirements of candidates preparing for Group C of the Cambridge Higher Local, the Senior Cambridge and University of London Examinations. As far as circumstances will allow, the lectures will be arranged to suit the individual wants of students who present themselves.

Fee, £5 5s. for three Terms; £4 4s. for two consecutive Terms; £3 3s. for the first or second Term singly; £2 2s. for the third Term.

#### TUTORIAL CLASS.

Wednesday, 2.30—4.

This class, which will be held during the first and second Terms, is supplementary to the Elementary and Intermediate Courses, and is occupied in giving additional individual instruction in working out examples and test papers, and in the supervision of notes; to enable students to keep pace with the lectures and regular work of their respective courses.

**MIXED MATHEMATICS.**

Professor, D. C. SELMAN.

ELEMENTARY MATHEMATICAL COURSE.

STATICS, DYNAMICS, AND HYDROMECHANICS.

This course will comprise the Mechanics and Mixed Mathematics required for the Intermediate Examinations in Arts and Science of the University of London, and will be suited to the requirements of Engineering students of the second and third year. It will form a necessary introduction to the Advanced Mathematical Course of Higher Mechanics.

FIRST AND SECOND TERMS.

Tuesday and Thursday, 12.

STATICS.

*Statics of a Particle.*—Measurement and Graphic Representation of Force. Parallelogram, Triangle, and Polygon of Forces. Theorems relating to moments about a point and a line. Conditions of Equilibrium.

*Statics of a System of Particles.*—Conditions of Equilibrium for Coplanar Forces. Resultant of two or more Parallel Forces. Parallelogram law of Couples. Poincot's Central Axis.

*Statics of Constrained Bodies.*—Bending Moments. Loaded Beams. Tension and equilibrium of a string on a smooth surface. Funicular Polygon. Stress Diagrams. Suspension Chains.

*Theorems relating to Centre of Mass.*—Centroids. Centroid of a Triangle, Pyramid, Arc of Circle, and Zone of Sphere. Theorems of Pappus.

*Friction.*—Laws of Friction. Limiting Friction. Tension of a string on a rough surface. Rolling Friction.

*Principle of Virtual Work.*—Position of stability and instability. General theorem relating to Potential Energy.

*Machines.*—Lever, Wheel and Axle, Systems of Pulleys, Inclined Plane, Screw, Steelyard, Roberval's Balance, Differential Combinations.

*Elasticity.*—Simple and Compound Stresses and Strains. Ellipse of Stress. Combined Twisting and Bending.

### DYNAMICS.

*Dynamics of a Particle.*—Kinematics. Laws of Motion. Parallelogram of Velocities and Accelerations. Hodograph. Relative Motion. Angular Motion. Harmonic Motion. Elliptic Motion. Parabolic Motion. Force. Mass. Density. Weight. Attwood's Machine. Value of "g." Gravitation. Newton's Law of Attraction. Fundamental Units. Derived Units. Dimensions of Units.

*Uniform and Uniformly Accelerated Motion.*—General Formulæ. Geometrical Representation. Motion down Inclined Plane. Kinetic Energy and Work. Rate of Work and Horse-power. Conservation of Energy. Projectiles.

*Collision.*—Nature of an impulse. Elasticity. Direct and Oblique Impact. Force of Compression and Restitution. Motion of Chains. Kinetic Energy after Impact.

*Motion about a Fixed Axis.*—Instantaneous Axis of Rotation. Three-bar Motion. Cycloidal Motion. The Pendulum. Centres of Oscillation and Suspension. Determination of "g." Pressure on Fixed Axis. Theory of Vortices. The Anemometer.

## THIRD TERM.

Tuesday and Thursday, 12.

## HYDROSTATICS.

*Fundamental Properties of Fluids.*—Density. Specific Gravity. Pressure at different points of a Fluid. Centre of Pressure. Transmission of Pressure. Siphon. Fluid Friction.

*Equilibrium of a Floating Body.*—Finite Displacements. Surface of Buoyancy. Metacentre. Oscillations. Stability in General.

*Hydraulic Machines.*—Diving Bell. Pumps. Bramah's Press. Turbines. Hydraulic Cranes. Accumulators. Propellers. Dynamic Head.

*Rotation of Fluids.*—Hydraulic Governors. Surfaces of Equal Pressure. Whole Pressure. Wave Motion. Vortex Motion.

Text Books.—Greave's *Elementary Statics*; Williamson's and Tarlton's *Dynamics*; Besant's *Hydrostatics and Hydromechanics*.

Fee, £4 4s. for three Terms; £3 3s. for two Terms; £2 2s. for one Term.

**EXPERIMENTAL PHYSICS.**

Professor, J. RYAN, M.A., D.Sc., LL.M.

Lecturer, LLEWELYN N. TYACK.

ELEMENTARY COURSE (FIRST YEAR).

Tuesday and Thursday, 12—I.

## EXERCISE CLASS.

Monday, 11—12.

*This course follows the two syllabuses of (i.) Mechanics, and (ii.) Heat and Light, prescribed by the new regulations for the London Matriculation Examination. Magnetism and Electricity are treated very fully in the Second Year's Course.*



## FIRST TERM.

*Mechanics.*—Force. Velocity and Acceleration. Mass and Momentum. The Laws of Motion. Motion of Falling Bodies. Composition and Resolution of Velocities and Accelerations. Equilibrium, Composition, and Resolution of Forces. Parallelogram, Triangle, and Polygon of Forces. Mechanical Advantage. Simple Machines. Friction. Moments and Couples. Centre of Gravity. Pendulums. Work. Energy. Horse-power.

## SECOND TERM.

*Hydrostatics and Pneumatics.*—Pressure of Liquids and Gases—its equal diffusion and variation with the depth. Equilibrium of Liquids and Gases. Specific Gravity, and methods of determining it. The Barometer, Siphon, Common Pump, and Forcing Pump. Air-Pumps: *Mechanical*—Otto von Guericke's, Boyle's, Bianchi's; *Mercurial*—Statical and Dynamical; Sprengel's; Condensing Air-Pumps. Capillarity.

*Heat.*—Its Sources. Effects of Heat on the Physical Properties of Bodies. The Solid, Liquid, and Gaseous conditions of Matter. Their dependance on Pressure and Temperature. Expansion, Apparent and Absolute. Definitions of Heat and Temperature. Specific Heat. Construction of Instruments for the measurement of Heat and of Temperature. Thermometers. Calorimeters. Pyrometers. The Mercurial Thermometer. Scales: Fahrenheit, Celsius, and Réaumur. Law of Gay Lussac. Air Thermometers. Absolute Zero of Temperature.

## THIRD TERM.

*Heat (continued).*—Latent Heat. Liquefaction and Solidification. Vaporisation and Condensation; Ebullition; Properties of Vapours, Saturated and

Unsaturated. Transmission of Heat by Conduction and Convection. Radiation.

*Light*.—Propagation of Light in straight lines in uniform media. Velocity of Light and modes of determining it. Intensity of Light: its variation with distance. Shadows. Photometry. Reflection and Refraction at plane and spherical surfaces. Formation of Images by plane and spherical mirrors, and by simple lenses. Decomposition of white Light by a prism. The Prismatic Spectrum.

Text-books.—Lodge's *Elementary Mechanics* (W. and R. Chambers); Garnett's *Heat* (Deighton, Bell, and Co.); Aldis's *Geometrical Optics* (Deighton, Bell, and Co.).

Fee, £5 5s. for three Terms; £4 4s. for two consecutive Terms; £3 3s. for the first or second Term singly; £2 2s. for the third Term. Exercise Class, £1 1s. each Term.

#### INTERMEDIATE COURSE (SECOND YEAR).

Professor, J. RYAN, M.A., D.Sc., LL.M.

Wednesday and Friday, 11—12.

FIRST TERM.—GENERAL PHYSICS, MAGNETISM, ELECTROSTATICS.

*General Physics*.—Fundamental and Derived Units of Measurement. Dimensions of Units. The Centimetre-Gramme-Second System. The Chief Forces of Nature. General relations of Matter and Energy. The Conservation and Transmutation of Energy. Diffusion of Liquids and Gases. Elasticity of Solids, Liquids, and Gases. Particular problems in Hydrostatics and Pneumatics. Capillarity.

*Magnetism*.—Magnets, Natural and Artificial. The Compass and Dipping Needle. Measurement of Magnetic Forces. Terrestrial Magnetism. Diamagnetism.

*Electrostatics.*—Fundamental Experiments on Electrostatic Attractions and Repulsions. Notions of Quantity and Distribution. Phenomena of Induction. Electrical Machines. The Leyden Jar. Measurement of Potential, Capacity, and Quantity. Electrometers. Phenomena of Discharge.

SECOND TERM.—ELECTRIC CURRENTS, APPLICATIONS,  
THERMODYNAMICS, HEAT.

*Electric Currents.*—Mechanical, Thermal, and Chemical methods of generating Electric Currents. The Voltaic Cell. Batteries. Galvanometers. Electromagnetism. Action between Magnets and Currents. Phenomena of Induced Currents. The Induction Coil. Measurement of Resistance and Electromotive Force.

*Applications.*—Chemical Actions of the Current. Electrolysis and Electroplating. Thermo-Electricity. Heating effects of the Current. Electric Lighting. Arc and Incandescence Lamps. Accumulators. Telegraphs and Telephones. Dynamo-Electric Machinery. Electro-motors. Transmission of Power by Electricity.

*Thermodynamics.*—Mechanical Equivalent of Heat. Conditions of Heat Transference. The Law of Conservation of Energy as a fundamental principle of Physics. The Dissipation of Energy.

*Heat.*—Newton's Law of Cooling. Experiments of Dulong and Petit. Change of State. Liquefaction. Solidification. Vaporisation. Tension of Vapours. Dalton's Laws of Evaporation. Andrews' Experiments. The Critical Point. Changes in Melting and Boiling Points produced by Pressure. Measurement of Coefficients of Expansion and other Constants.

THIRD TERM.—ACOUSTICS, PHYSICAL OPTICS,  
RADIATION.

*Acoustics.*—Production and Propagation of Sound Waves. Velocity of Sound. Dependence on Temperature. Effect of Changes of Elasticity and Density in the Medium. Newton's Law of Velocity and Laplace's modification of it. Reflection and Refraction of Sound. Production of Harmonics, and their relation to the Fundamental. Musical Scales. Temperament. Vibrations of Rods, Strings, and Columns of Air. Sensitive Flames. Methods of determining the Pitch of Musical Sounds. The Siren. Resonance. Resonators. Analysis of Complex Sounds. Acoustical Interference. Beats. Physical Theory of Music. The Vowel Sounds. Phonoscopes and Phonographs. The Human Ear.

*Physical Optics.*—Theories of Propagation of Light. Measurement of Velocity of Light. Photometry. Refraction through Lenses, including formation of Images. Focal Lines. Caustics. Spherical Aberration. Chromatic Aberration. Optical Description of Eye and Theory of Unaided Vision. Vision through Lenses, Microscopes, and Telescopes. Galileo's, Newton's, Herschel's, and Gregory's Telescopes. Wave Theory of Light: its explanation of Reflection and Refraction. Huygens' Principle. Measurement of Focal Lengths of Mirrors and Lenses, and of Indices of Refraction.

*Radiation.*—The Law of the Inverse Square of the Distance. Intrinsic Brightness and Intensity of Illumination. Dispersion of Light. The Rainbow. The Spectroscope. The Spectrometer. Spectrum Analysis. Phosphorescence and Fluorescence. Radiation and Absorption of Heat Rays. Calorescence. Theory of Exchanges. Variation with Temperature of Quality and Quantity of Radiation.

This course meets the requirements of the Intermediate Examination in Science (Honours) of the University of London.

**Text-Books.**—The text-books which students are advised to purchase are, S. P. Thompson's *Elementary Lessons in Electricity and Magnetism* (Macmillan and Co.), Balfour Stewart's *Heat* (Clar. Press), and Everett's edition of Deschanel's *Natural Philosophy, Vol. IV., Sound and Light* (Blackie and Son). The following works, most of which are in the College Library, are recommended for constant reference and reading: Thomson and Tait's *Natural Philosophy*; Clerk Maxwell's *Theory of Heat*; Shann's *Heat*; Maxwell's *Elementary Treatise on Electricity*, edited by W. Garnett; Müller-Pouillet's *Physik*; Jamin and Bouty's *Cours de Physique*; Gordon's *Physical Treatise on Electricity and Magnetism*.

Fee, £5 5s. for three Terms; £4 4s. for two consecutive Terms; £3 3s. for the first or second Term singly; £2 2s. for the third Term.

#### ADVANCED COURSE (THIRD YEAR).

Professor, J. RYAN, M.A., D.Sc., LL.M.

Monday and Wednesday, 4—5.

An Advanced Course of about forty lectures on Physics will be given during the first and second Terms. The course will comprise the following subjects:—

*Heat.*—Methods of measuring Specific Heat, Latent Heat, and Vapour Pressure, with chief results that have been obtained. Regnault's Experiments. Measurement of Coefficients of Conduction of Solids, and their variation with temperature. Fourier's Conclusions. Experiments of Despretz, Forbes, Wiedemann and Franz, Angström and Thalen. Measurements of Conductivity of Liquids and Gases. Distinction between Thermometric Conductivity and Calorimetric Conductivity. The Kinetic Theory of Gases, and deductions therefrom.

*Thermodynamics.*—History of the Science. Its fundamental principles. Various statements of the Second Law. The Theory of the Dissipation of Energy. Carnot's Principle: his Cycles, and test of a Perfect Engine (1824).

Thomson's Absolute Thermodynamic Scale (1848). Joule's Experiments. Entropy of Clausius and Maxwell. Thermodynamic Function of Rankine. Rankine's treatment of the subject. Specific Heat of Saturated Steam, negative. Influence of Pressure on the Melting Point of Ice, and on Change of State in general. Other predictions from Theory.

Applications of the principles to Radiation, and other branches of Science.

Transformations of Energy. The availability of Energy. Modern Heat Engines compared with Carnot's ideal.

*Acoustics.*—Indirect Methods of measuring the Velocity of Sound. Kundt's Experiments. Vibration of Plates and Membranes. Composition of Vibrations. Beats. Optical Methods of Examination. Lissajous' Experiments. Sensitive Flames. Sensitive Smoke and Water Jets. Resultant Tones. Determination of Absolute Pitch. Diffraction of Sound. Phonoscopes and Phonographs. Radiophony. The Photophone.

*Light.*—Conditions of Achromatism in thin Compound Prisms and Lenses. Ramsden's Eyepiece. Huyghen's Eyepiece. Measurement of magnifying power of Microscopes and Telescopes. [Measurement of Dispersive Power of Media. Spectrum Analysis. Selective Absorption. Phenomena of Interference and Diffraction. Newton's Rings. Fresnel's Mirror and Biprism. The Optical Bench. Double Refraction and Polarisation of Light. Nicol's Prism. Interference of Polarised Light. Circular Polarisation. Elliptical Polarisation. Optic



Axes of Crystals. Wave Surface. Conical Refraction. Saccharimeters and Polariscopes. Electro-optics. The Electro-magnetic Theory of Light. Determination of Velocity of Light by comparison of Electrostatic and Electromagnetic Units.

*Magnetism.*—Magnetic Moments, and Methods of comparing them. The Methods of determining the Dip, Total Intensity, and Magnetic Declination at any place. Secular and Diurnal Variations. Disturbances and their Laws. Connection between Magnetic Disturbances and other Phenomena. Diamagnetism.

*Electricity.*—Measurement of Electrical Density, Capacity, Quantity, Potential, Electro-motive Force, Current, Resistance, Mutual Induction, and Self Induction. Theory of the Voltaic Battery. Construction of Electrical Standards. The Laws of the Distribution of Currents, and of their action on one another. The Transmission of Electrical Energy. The choice and determination of Electrical and Magnetic Units. Ratio of the two Systems of Units.

*Physical Measurements.*—Errors of Observation. Elimination of these. Method of least squares. Graphic Methods. Moment of Inertia. Friction. Torsion. Elasticity. Determination of Coefficients.

The subjects comprised in this and the preceding course cover those prescribed for candidates in Physics (Honours) for the degree of Bachelor of Science in the University of London.

Fee, two Terms, £4 4s.; one Term, £3 3s.

### **ELECTRO-TECHNICS.**

Professor, J. RYAN, M.A., D.Sc., LL.M.

Monday and Wednesday, 4—5.

This course will be delivered during the third Term.

*Dynamo-electric Machinery.*—Magneto-electric Induction. Design and Construction of Armatures and Field Magnets. Geometrical Methods, Characteristic Curves, &c. Arrangements for Regulation of Speed, Current, and Potential.

*Incandescence Lamps.*—Theory and Construction. Most economical Potential Difference. Various Systems of Grouping.

*Arc Lamps.*—Behaviour of the Arc. Construction of Regulators. Electric Candles. Cut-outs, Shunts, Accessories, &c.

*Photometry.*—Light Standards. Photometers.

*Distribution of Electricity and Transmission of Power.*—Transformers. Dynamotors. Electric Motors: their Design, Construction and Regulation. Telpherage. Electrical Railways. Economy of Conductors. Varieties of Electrical Mains.

*Accumulators.*—Theory of these, and their various types.

*Measuring Instruments.*—Theory, Construction, and Use. Transmission and Brake Dynamometers. Ammeters and Voltmeters. Wattmeters. Ohmmeters. Electric Meters. Measurement of Intense Magnetic Fields.

*Telegraphic and Telephonic Engineering.*—Chief types of Instruments. Construction and Testing of Lines, &c. Quadruplex Telegraphy.

Fee, £3 3s.

## PHYSICAL AND ELECTRICAL LABORATORIES.

Professor, J. RYAN, M.A., D.Sc., LL.M.

Demonstrator, LLEWELYN N. TYACK.

### PRACTICAL PHYSICS—LABORATORY INSTRUCTION.

The Physical and Electrical Laboratories are open daily from 10—5, except on Saturdays.

A general course of Laboratory Instruction will be carried on under the immediate supervision of the Professor and Demonstrator. The object of this course is to enable students to acquire skill in the use of instruments for physical measurement and research, and practical acquaintance with general experimental work. The course includes the verification of the more general laws of Physics, including Acoustics, Optics, Heat, Magnetism, and Electricity.

A special course of instruction in Electricity will be given to students working in the *Electrical Laboratory*. They will be instructed in the principles and practice of Electrical Testing, in the measurement of Electromotive Force, Resistance, Electric Energy, and in the efficiency of Electrical Machinery. Instruction will also be given in the management and testing of Dynamo-Electric Machinery, Electric Arc Lamps and incandescence Lamps, and in the management and construction of Electrical Instruments and Appliances in general use.

Any damage to apparatus arising from carelessness must be made good.

Students entering for Laboratory work will deposit 10/- in the hands of the Secretary as caution-money, to be returned at the close of the Session.

Students may for convenience arrange to divide their days of Laboratory work into half-days.

#### FEES IN GUINEAS.

	5 days a week.	4 days a week.	3 days. a week.	2 days a week.	1 day a week.
For the Session ...	18	15	11½	8½	5
„ two Terms ...	13	11	8½	6	4
„ one Term ...	7	6	5	3½	2

## PRACTICAL ELECTRICAL MEASUREMENT.

Lecturer and Demonstrator, LLEWELYN N. TYACK.

A series of Lectures on this subject will be delivered on Fridays at 4 o'clock. The course, which is intended more particularly for those working in the Electrical Laboratory or engaged in electrical work elsewhere, will treat of measuring instruments—their theory, construction, and use—and of the theory and practice of general electrical measurement.

Fee, £2 2s. for three Terms; £1 11s. 6d. for two Terms; £1 1s. for a single Term.

## ENGINEERING.

Professor, J. RYAN, M.A., D.Sc., LL.M.

Lecturer, D. C. SELMAN, Assoc. M. Inst. C.E.

### FIRST YEAR.

FIRST TERM.—Tuesday and Thursday, 12—I.

### EXPERIMENTAL COURSE OF ELEMENTARY MECHANICS, HYDROMECHANICS, &c.

Force. Velocity and Acceleration. Mass and Momentum. The Laws of Motion. The Motion of Falling Bodies. Composition and Resolution of Velocities and Accelerations. The Equilibrium, Composition, and Resolution of Forces. The Parallelogram, Triangle, and Polygon of Forces, &c. Mechanical Advantage. The Simple Machines. Centre of Gravity. Pendulums. Centre of Inertia. *Work*: its Principles and Application to Machines. The Diagram of Work. *Energy*. *Horse-power*.

SECOND TERM.—Tuesday and Thursday, 10—11.

*Hydromechanics, &c.*—The Elements of Hydro-mechanics. The Pressure of Water on Dock-gates, Walls, and Embankments. Lifting and Force Pumps. The Hydraulic Press. Hydraulic Cranes and Motors. The Pressure of the Atmosphere. The Mercurial and Aneroid Barometers. Pressure and Vacuum Gauges.

*Applied Mechanics and Strength of Materials.*—Applications of the Simple Machines. Friction. Workshop Manipulation. The Preparation of Plane Surfaces. Stress, Strain, Factor of Safety, Rigidity, Pliability, Elasticity, Resilience, &c. Nature of the loads to which a structure is subjected. Conditions of equilibrium of a structure. The elements of Graphical Statics. Reciprocal Diagrams of Forces and of Stresses. The Funicular Polygon. Graphical Solution of various examples of Roof and Bridge Trusses. The nature of internal resistance of various parts of a structure. Live and dead Loads. Fatigue of materials. Testing Machines. Timber. Cast Iron and Castings. Wrought Iron and its uses. The hardening and tempering of Steel. Other metals and different kinds of alloys. Simple calculations connected with the design of Beams and Girders. Beams of uniform strength. Strength of Columns and of Structures subjected to internal pressure.

THIRD TERM.—Tuesday and Thursday, 10—11.

#### CIVIL ENGINEERING.

Preservation of Timber. Artificial Stones and Hydraulic Cements. Brickwork. Masonry. The stability of Walls and Buttresses. Sub-Structure and Foundations. Piles and Pile Driving. Cofferdams. Common roads: Material, Construction, Maintenance, and Draining. Stone, Wood, and

Asphalt Pavement. Railways: Broad and Narrow Gauge. Different kinds of Rails. Switches and Crossings. Tunnels and Embankments. Tramways: the different systems of horse and steam traction. Classification of Canals. The Laying out and construction of Locks. Foreign Canals. Ship-Canals. Streams and Rivers. Measurements of Velocity at different cross sections. Floods. Different kinds of facing for Banks. Construction of Dams and Weirs. Marine Engineering. Sea Defences and Embankments. Breakwaters. Piers. Harbours. Docks. Supply of Water to Towns. Rain, spring, well, and river water. Mode of distribution of water-supply. Drainage of Lands and Towns. Sanitary Engineering. Ventilation. Reclamation and Irrigation of Land.

If necessary, there will be lectures on—

*Mining.*—Statistics. The Chief Coal-fields. Preliminary trials. Methods of Boring. “Winning” and “Getting.” “Pillar” and “Long-Wall” Work. Relative Advantages. Examples: (1) Scotland, Northumberland, and South Wales; (2) Derbyshire, &c. Coal-cutting Machinery. Blasting and Wedging. Metalliferous Mines, especially Iron. Nature and occurrence of Deposits. Prospecting. Driving Levels and Drifts. Sinking Shafts. Securing Excavations. Open Work. Hydraulic Mining. Hauling and Winding. Drainage. Ventilation. Lighting.

## SECOND YEAR.

FIRST TERM.—Tuesday and Thursday, 10—11.

*Prime Movers.*—(1) Sources of Energy in Nature. Fuel, Wind, Water, and Tides. Transformation of Energy. Efficiency of Motors. (2) Theory of Heat Engines. Laws of Heat Transference. The Conduction of Heat. Elementary Thermodynamics.



Joule's Equivalent. (3) Nature and Properties of Steam. Investigations of Watt and Regnault. Steam Boilers. The History of the Steam Engine: its development. The Engines of Savary, Newcomen, and Watt. Varieties of Engines—Stationary, Locomotive, and Marine. The Beam Engine. Pumping Engines. Compound Engines. Triple and Quadruple Expansion Engines. The Injector. The Indicator. Nominal, Indicated, and Nett Horse-power. (4) Hot-air Engines—Stirling and Ericsson. (5) Gas Engines.

SECOND TERM.—Tuesday and Thursday, 12—1.

*Kinematics of Machinery.*—History of the Science. Lower and Higher Pairs of Elements. Kinematic Links and Chains. Force and Pair Closure. Centroids and Axoids. Toothed Wheels. Bevil and Screw Gearing. The notation and symbols of Reuleaux. Kinematic Analysis. Formulas of the Simple Machines, and of various other Mechanisms. Various examples of the Quadric Crank Chain found in Parallel and Straight Line Motions, Sewing Machines, Printing and Engraving Machines, Shearing Machines, Power Looms, Reversing and Quick Return Motions, etc. Various examples of the Slider Crank Chain in Prime Movers and other Machines. Chamber Crank Trains and Chamber Wheel Trains. Wheels in Trains. Epicyclic Trains. The nature of the Constructive Elements of Machinery. Free and fast click Trains, Cams, and Ratchets. Differential Screw and Pulley. Apparatus for Measuring and for Regulating the Rate of Motion, such as Escapements of Clocks and Watches, and Governors. The Analysis of miscellaneous contrivances and of complete Machines, such as for Rope-making and other purposes. Kinematic Synthesis.

## THIRD TERM.—Monday and Friday, 12—I.

## CIVIL ENGINEERING.

The lectures during this Term will treat more fully of the subjects of the third Term in the first year, as well as—

Stability of Earthwork and of Retaining Walls. The theory and relative advantages of various forms of Testing Machines, and the manner of conducting Experiments and of interpreting results. The results obtained with the more important materials by various experimenters, both with live and dead loads. The employment of Steel in modern structures. Problems connected with Beams and Girders. Beams of greatest strength for different kinds of loading. Girders with parallel flanges connected by vertical and diagonal bracing. Braced Girders with oblique or curved flanges, including the crescent and bow-string Girder and braced Arch. Modes of finding deflection. Continuous Girders. Weight of Girders and limiting span. Estimation of Girder work. Cast Iron Bridges. Different forms of Suspension Bridges, Movable and Swing Bridges.

If necessary, there will be lectures on—

*Principles of Mining.*—Surveying Underground. Compass and Theodolite. Laying out Workings. Sinking of Shafts. Quicksands and Water-bearing Strata. Drainage. Adit-Levels. Pumps and Pumping Engines. Ventilation—Natural and Artificial. Furnaces. Mechanical means: Fans, as Guibal's, &c. Aspirators. Distribution of Air. Ansell's Indicator. Lighting: Safety Lamps. Haulage Systems: Tail-rope and Endless Chain or Rope. Winding Engines. Safety Catches. Surface Arrangements.

## THIRD YEAR.

Monday and Friday, 12—1.

## FIRST TERM.

The lectures in this Term will consist of a more advanced treatment of the subjects dealt with in the first Term of the Second Year's course.

*Thermodynamics.*—Its Laws. History of the Science. Various statements of the Second Law. Transformations of Energy. The theory of the Dissipation of Energy. Carnot's principle: his Cycles, and test of a Perfect Engine (1824). Thomson's absolute Thermodynamic Scale (1848). The availability of Energy. Joule's Experiments. Entropy of Clausius and Maxwell—Thermodynamic Function of Rankine. Influence of pressure on melting points, and on change of state in general.

Modern Heat Engines: Steam, Air, and Gas compared with Carnot's ideal. Electrical Engines.

*Steam.*—Its properties as determined by experiment. The results of Regnault and others. Saturated Steam. Superheated Steam. The relations between Pressure, Density, and Temperature of Steam.

Calculations of the efficiency, &c., of Furnaces and Boilers. Explosions.

Feed-pumps. Injectors. Condensers. The Surface Condenser. The Ejector Condenser.

The various types of Steam Engines: their objects and efficiency. The Indicator. Indicator Diagrams, and Diagrams of effort and work upon the Crank-pin. Valves and Valve-gearing. Link Motions. The Slide Valve. Expansion Valves, &c. Fly-wheels. Governors, &c. The advantages of Compound Engines: their forms and arrangements. Triple and Quadruple Expansion Engines. Rotary

Engines: their forms and arrangements. The "Fielding" Engine. The Tower Spherical Engine. The behaviour of Steam in the Cylinder. Condensation and Re-evaporation. Compounding. Multiple Expansion. The Steam Jacket. The distribution of Heat in the Cylinder. Theories of the Steam Engine.

#### SECOND TERM.

The subjects treated in this Term will be arranged to suit the majority of the third year students, and will be selected from the following :

*Dynamometers.*—The Theory and Construction of the different forms of Absorption and Transmission Dynamometers.

*Engines.*—The experimental testing of Steam Engines. The results. Theory of the Gas Engine. Its various forms. Air Engines.

*Transmission of Power.*—Discussion of the Methods: Mechanical, Pneumatic, Hydraulic, and Electrical. The advantages and disadvantages of each. Their applicability to special purposes.

*Machine Design.*—The Strength and Behaviour of Materials under the action of Loads, with practical Demonstrations in the Engineering Laboratory by means of the large Testing Machine. The Strength and Form of the Constructive Elements of Machinery. Specifications. Estimates, &c.

*Manufacturing Processes.*—Iron and Steel. Dependence of their mechanical properties on physical treatment and chemical composition. Resistance to variously applied loads. Power of resisting wear. Soft Steel *v.* Hard Steel. The relative merits of Iron and Steel for various purposes. The Steel Age. Comparison of the products of the Siemens, Bessemer (acid), and Gilchrist Processes. Crucible Steel. Recent Researches and Improvements. The results of Pressure and of Hammering. Whit-

worth's Process. Tool Steel. The Effects of Tungsten, Chromium, &c. Other Metals and Alloys: their resisting and wearing properties. Gun-metal, Brass, White Metal, Phosphor Bronze, &c. Effects of Rolling, Wiredrawing, and other mechanical treatment. The Hardening and Tempering of Tools, Springs, &c. Case-hardening. Malleable Cast Iron.

Casting in Iron, Steel, Gun-metal, &c. Annealing. Workshop Manipulation.

*Hydraulic Engineering.*—The estimation of the amount of Rainfall in a district available for purposes of Power: its collection and supply. The Height, Extent, and Curve of Swell or Backwater. Reservoirs and Reservoir Sluices. Motion of Water in Conduit Pipes, and Loss of Energy by Eddies and Broken Water. Theory of Overshot and other forms of Vertical Water-wheels. Friction of Water-wheels, and their total and effective delivery. Theory of various forms of Horizontal Water-wheels, including impact and tub-wheels, tangential wheels, jet turbines, reaction wheels; inward, parallel, outward-flow, and screw turbines. Reciprocating Water-pressure Engines: their theoretical and actual efficiency, and the valves and regulators of different kinds employed with them.

The theory of Wind-wheels, and mechanical efficiency of Windmills.

Works for Reference.—*Mechanics of Engineering*, Weisbach (Wiley and Sons, New York). *Elements of Machine Design*, Unwin (Longmans). *The Mechanical Theory of Heat*, Clausius. *Fuel and Water*, Schwachhöfer and Browne. *A Treatise on Steam Boilers*, Wilson. *The Steam Engine*, Cotterill. *Manual of Marine Engineering*, Seaton. *The Steam Engine and other Prime Movers*, Rankine. Various Papers in *Minutes of Proceedings Inst. C.E. and M.E.* (Special Works in College Library.)

Fee for each course, £7 7s. for three Terms; £5 5s. for two consecutive Terms; £3 3s. for a single Term.



**ENGINEERING LABORATORY AND WORKSHOP.**

Professor, J. RYAN, M.A., D.Sc., LL.M.

Demonstrator, ALFRED MACKETT.

**ENGINEERING LABORATORY.**

The instruction in the Engineering Laboratory is intended to supply that necessary information and experience which it is not, as a rule, possible to acquire in the ordinary routine of Engineering works or offices. With this view an opportunity will be afforded to students of dealing with various instruments of precision, and of gaining a scientific knowledge of the nature, properties, and strength of materials, as well as of the mode of determining the efficiency of Machines and Prime Movers. In addition to this, the simple laws of Mechanics will be verified by means of suitable apparatus.

1. The Laboratory is provided with a powerful Testing Machine, by Messrs. J. Buckton and Co., Leeds, capable of exerting upon the test piece a force of 50 tons.

By means of this Machine the nature and strength of the various materials employed in construction may be examined by experiments upon tension, compression, torsion, shearing, bending, deflection, and cross-breaking, and the laws of simple beams and girders verified.

The complete testing of iron and steel, cement and other materials, in the form of rods, bars, plates, pipes, and cubes, has been recently undertaken and performed in the Laboratory for the Manufacturers of the neighbourhood. Several Engineers have already availed themselves of this opportunity of having important materials tested in Bristol instead of sending them to London, as heretofore, and still more extended usefulness is anticipated for this undertaking.



2. Experiments illustrating the Elasticity of Metals and the general principles of Mechanics form part of this course.

3. Means are provided for practical investigation in connection with

- (I.) The testing of Pressure-Gauges.
- (II.) The testing of Lubricants.
- (III.) Friction.
- (IV.) Torsion.
- (V.) The testing of Springs.
- (VI.) Hydraulic experiments and screw-propellers.
- (VII.) Stresses and strains in the parts of structures.
- (VIII.) The transmission of Power.
- (IX.) The strength and elasticity of wires.

4. Dynamo-electric machinery and Electrical testing instruments are also provided. Three dynamos and motors are at present available, and students are encouraged to construct small machines for themselves.

5. At present this Department is provided with a Gas Engine, which supplies the power necessary for making dynamometrical experiments. Until it is possible to obtain a Steam Engine and Boiler, by which matters such as the consumption of Fuel and Steam may be experimentally treated, experiments will be made upon certain Engines at Works in the city, permission for doing which has been kindly granted.

Fee (three hours a week), £4 4s. for three Terms ;  
£3 3s. for two Terms ; £2 2s. for one Term.

#### WORKSHOP.

The Workshop is intended to afford, to those who may wish to avail themselves of it, an opportunity of obtaining a practical acquaintance with the

use of tools and machinery. At the same time it must be understood that such instruction cannot take the place of the six months' course in Engineering works, which is part of the scheme of Mechanical Engineering, or of the practical experience which must eventually be acquired in Electrical works by students of Electrical Engineering.

Instruction will be given in the following subjects: Carpentering and the use of carpentering tools. Filing and Fitting. The use of the forge and smiths' tools, and the hardening and tempering of steel and the case-hardening of iron. Moulding and casting of gun-metal and other alloys on a small scale. Hand-turning. The use of the self-acting lathe for turning, boring, and screw-cutting. The preparation of standard gauges, of plane surfaces, and of cutting tools.

Students will be assisted to construct the apparatus required by them for their own use in the various departments of the College: the work for electrical students being such as galvanometers, switches, Wheatstone bridges, resistance-boxes, electric bells and batteries, telephones, microphones, dynamo-electric machines, motors, and other instruments.

Fee (four hours a week), £4 4s. for three Terms; £3 3s. for two terms; £2 2s. for one Term.

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Combined Fee for the Engineering Laboratory and the Workshop (seven hours a week), £7 7s. for three Terms; £5 5s. for two Terms; £3 3s. for one Term.

**MACHINE DESIGN AND DRAWING.**

Professor, J. RYAN, M.A., D.Sc., LL.M.

Lecturer, D. C. SELMAN, Assoc. M. Inst. C.E.

Monday and Friday, 2—4.

**FIRST YEAR.**

(1.) The preparation of tracings, working and finished drawings. Drawing to scale and from models; also from actual machines and portions of machines.

(2.) Graphic modes of representing results. The working out of simple diagrams of stress in connection with the lectures on Engineering.

**SECOND YEAR.**

(1.) The preparation of working drawings from dimensioned sketches. General arrangements and finished drawings. Designing details of machines from standard patterns. Design of steam boilers.

(2.) Construction and methods of drawing of toothed, screw and worm gearing.

Graphic methods of estimating stress in simple Roof Trusses and Girder Bridges.

**THIRD YEAR.**

(1.) The design of riveted joints and steam boilers.

(2.) The design and drawing of details of machinery and complete machines from given data, or specifications. Method of estimating cost for manufacture.

(3.) Theory and design of Valve Gears, Trip Gears, and various forms of high-speed Governors. Automatic Expansion Gears.

(4.) Graphic method of estimating stresses. Bending Moments. Combined twisting and bending. Bending Moment and shearing Force Diagrams for travelling load systems. Culmann's Theorem and Ritter's Method of Sections. Design of Roof Trusses and Lattice Girders. Lattice Piers and Towers.

Text-Books.—Unwin's *Elements of Machine Design*; Clark's *Graphic Statics*. Alexander and Thomson's *Applied Mechanics, Part II.*; Bow's *Economics of Construction*.

Fee for each year's course, £5 5s. for two Terms; £3 3s. for one Term.

## GEOMETRICAL DRAWING.

Professor, J. RYAN, M.A., D.Sc., LL.M.

Lecturer, D. C. SELMAN, Assoc. M. Inst. C.E.

Tuesday and Thursday, 2—4.

### ELEMENTARY COURSE.

*Plane Geometry*.—The construction of Scales. The description of Polygons. The transformation of Areas. Division of Figures. Construction of Figures of given Area. Proportionals. The Properties of the Circle.

*Solid Geometry*.—The representation of Points and Lines in Space. Straight Line and Plane. Projection of Solids. Sections of Solids by Oblique Planes. Developments. Penetrations. Elements of Perspective.

### ADVANCED COURSE.

*Plane Geometry*.—The construction and properties of the Circle, Parabola, Ellipse, Hyperbola, Cycloidal Curves, Spirals, Catenary and other Curves. Reciprocal Polars. Solution of Equations.

*Solid Geometry*.—Projection of Solids in given positions. Sections by Planes. Penetrations. Pro-

jection of Shadows. Scale of Slope. Contours. Isometric and Trimetric projection of Solids. Solution of Spherical Triangles. Architectural Perspective.

Text-books.—Angel's *Practical Geometry and Projection*; Sydenham's *Practical Geometry*; Eagle's *Constructive Geometry of Plane Curves*.

Fee, for two Terms, £4 4s.; one Term, £3 3s.

### SURVEYING.

Professor, J. RYAN, M.A., D.Sc., LL.M.

Lecturer, D. C. SELMAN, Assoc. M. Inst. C.E.

#### ELEMENTARY COURSE.

Wednesday, 2—5; Friday, 2—4.

This course will be taken during the third Term. Wednesday afternoon will be devoted to Practical instruction in the use of Surveying and Levelling Instruments, the keeping of Field and Level Books, the demarcation of Survey points, and to *Field Practice* in the neighbourhood. Friday afternoon will be devoted to the theory of Surveying, and to the plotting of the Field work.

Text-book.—*Land and Engineering Surveying*, T. Baker (Weale's Series).

Fee, £3 3s.

#### ADVANCED COURSE.

Tuesday and Thursday, 2—4.

An advanced course will be given during the third Term on the above days in the theory and practice of Surveying and Levelling, including a discussion of the various methods of Surveying with Chain, Telemeter, Plane Table, Compass, Sextant, and Theodolite; of Levelling operations and Contouring, and the sources of error in Levelling; of Setting out

Embankments, Cuttings and Tunnels, and Ranging Curves for Railway work; of Route Surveys by Land. Also the correction and adjustment of both Surveying and Levelling Instruments.

An afternoon will be devoted once a week to Field Practice.

Text-book.—*Aid to Survey Practice*, Jackson (Crosby, Lockwood, and Co.)

Fee, £3 3s.

## GEOLOGY.

### GENERAL COURSE.

Professor, C. LLOYD MORGAN.

Monday, Wednesday, and Friday, 4—5.

This course will be given during the first and second Terms. The lectures will be illustrated by specimens and diagrams.

### FIRST TERM.

I. *Structural Geology*.—The Earth: its form, density, and internal condition. The rocks which form its crust: their nature, mode of occurrence, mineral composition, and classification.

II. *Dynamical Geology*.—A. Processes of disintegration—(a) chemical, (b) mechanical. Rain, frost, atmospheric action, springs, rivers, glaciers, ocean waves. B. Processes of Reconstruction—(a) Chemical Deposits, (b) Mechanical Deposits, (c) Organic Deposits. C. Processes due to Internal Changes. Volcanoes, earthquakes, elevation and depression of the land.

III. *Physiographical Geology*.—Land and Sea. Continents and mountain ranges. Rivers and lakes. Earth-sculpture: (a) General or superficial denudation. (b) Special or linear denudation. (c) Marine or littoral denudation.



## SECOND TERM.

I. *Palæontology*.—The nature of fossils, and the processes of fossilisation. The Laws of the distribution of life in space and time.

II. *Stratigraphical Geology*.—The Geology of the Avon Basin. The Carboniferous System, as developed in the Bristol district and elsewhere. Systems older than the Carboniferous. Systems newer than the Carboniferous. The imperfection of the Geological Record. The lapse of Geological Time. Geological Changes of Climate.

Text-books.—*A Class-book of Geology*, A. Geikie (Macmillan); *Handbooks of Physical and Historical Geology*, A. J. Jukes-Browne (George Bell & Sons).

Fee, £4 4s. for two Terms; £3 3s. for one Term.

## APPLIED GEOLOGY.

Professor, C. LLOYD MORGAN.

Wednesday and Friday, 12—I.

This course, suitable to the requirements of Civil and Mining Engineers, will be given during the first and second Terms.

## FIRST TERM.

The rocks met with in railway-cuttings, tunnels, borings, wells, and mine-shafts. The nature and sequence of the rocks. The mode of determining their age, with a view to predicting the probable sequence in any locality. Short sketch of the sequence of rocks in Bristol and in other parts of England. The preparation of geological maps and sections.

## SECOND TERM.

The economic products met with in the secondary rocks. Building stones. Salt deposits. Iron deposits. Celestine. Coal. The methods by which

coal is won. Soils. Water supply. The more important vein-stuffs and metallic ores. Methods of exploration and exploitation.

### THIRD TERM.

During the third Term, excursions (of which due notice will be given) will be made to illustrative Railway and Natural Sections; and practical instruction in the methods of Field Geology will be given.

Fee, £5 5s. ; for one Term, £3 3s.

## TERTIARY GEOLOGY AND THE ANTIQUITY OF MAN.

ELEMENTARY POPULAR COURSE.

Professor, C. LLOYD MORGAN.

Wednesday, 3—4.

This course, which is in completion of that during the Session 1888-9, will be given during the first Term.

After an introductory sketch of the earlier stages of the Earth's History and the advance of Life in Palæozoic and Mesozoic Times, the lectures will treat of the changes which England has undergone during Tertiary Times, the gradual passage from tropical to arctic conditions of climate culminating in the Glacial Epoch, the earliest evidences of Man's existence, the nature of the animals which were then found in England, and the steps which led up to the Dawn of History.

Fee, £1 1s.

**EXCURSION CLASS.**

Professor, C. LLOYD MORGAN.

Saturday Afternoon.

An Excursion Class in Geology will, if there be ten or more entries, be formed during the third Term. Five or six excursions will be made to localities of geological interest.

Fee, £1 is.

The names of those who wish to join the class should be sent in to the Secretary on or before May 1st.

**MINERALOGY AND LITHOLOGY.**

Professor, C. LLOYD MORGAN.

Special arrangements can be made with regard to instruction in these subjects.

**PALÆONTOLOGY.**

Professor, C. LLOYD MORGAN.

Special arrangements can be made with regard to instruction in this subject.

**GEOLOGICAL LABORATORY.**

Professor, C. LLOYD MORGAN.

The Geological Laboratory is open daily from 10—4, except on Saturday.

A course of practical instruction in the methods of geological research, and on the characters of the more important minerals and rocks, will be conducted, under the supervision of the Professor.

Opportunities will be given for field work.

FEES IN GUINEAS—	5 days a week.	4 days a week.	2 days a week.
For the Session .....	8	6	4
„ two Terms .....	6	4½	3
„ one Term .....	3	2	1½

## BIOLOGY.

Professors, C. LLOYD MORGAN and ADOLPH LEIPNER.

These two leading divisions of Biology will be treated separately by the Lecturers on Botany and Zoology respectively.

## ZOOLOGY.

### SPECIAL ZOOLOGY COURSE.

Professor, C. LLOYD MORGAN.

Tuesday and Thursday, 2.30—5.

The elements of Vertebrate Morphology and Physiology, as exemplified by the Rabbit, the Pigeon, and the Frog.

The description of the external form, and the nomenclature of the parts of these animals.

The leading resemblances and differences in the plans of structure of the three. The chief features in their osteology, with special reference to the skull and limbs. The visceral anatomy of each, including the general structure of the brain, the spinal cord, and the sense organs.

The histological character of the blood, epidermal and epithelial organs, connective tissues, cartilage, bone, muscle, and nerve in these animals.

The character and mode of formation of their ova and spermatozoa.

The chief stages of the development of the Frog, Fowl, and Rabbit. The nature of the placenta in the latter.

The structure and life history of *Astacus*, *Lumbricus*, *Helix*, *Distoma*, *Hydra*, *Vorticella*, and *Amœba*.

This course is intended to meet the requirements of those who have entered for the Preliminary Scientific (M.B.) or Intermediate Examination in Science at the University of London.

A sum of 10s. 6d. is charged to each student, to defray the expense of material used.

Text-books.—*Animal Biology*, C. Lloyd Morgan (Rivingtons); *Practical Biology*, Huxley and Martin (Macmillans); *Practical Zoology*, Marshall and Hurst (Smith Elder); *Atlas of Biology*, Howes (Macmillans).

Fee, £5 5s. for three Terms; £4 4s. for two consecutive Terms; £3 3s. for the first or second Term singly; £2 2s. for the third Term.

## NATURAL HISTORY.

### ELEMENTARY POPULAR COURSE.

Professor, C. LLOYD MORGAN.

Wednesday, 3—4.

The subject of this course, given during the second Term, will be *The Structure and Habits of Animals*: its object is to stimulate interest in the study of Animal Life. The structure and habits of animals will be considered in a series of short biographical sketches of typical creatures. Among those selected will probably be the chimpanzee, lion, bear, walrus, seal, deer, camel, squirrel, whale, and manatee; ostrich, nightingale, humming-bird; cobra, lizard, chameleon; frog, shark, salmon, mud-fish; lobster, spider, bee, peripatus; oyster, limpet, and cuttle-

fish; worm, liver-fluke; jelly-fish, hydra, sea-anemone; Slipper animalcule, Proteus animalcule.

Fee, £1 1s.

### COMPARATIVE ANATOMY.

Professor, C. LLOYD MORGAN.

Monday, Wednesday, and Friday, 9—10.

This course is intended to meet the requirements of students preparing for the Fellowship Examination of the Royal College of Surgeons. It will be given during the Third Term.

Fee, £4 4s.

### BIOLOGICAL LABORATORY.

Professor, C. LLOYD MORGAN.

The Biological Laboratory is open daily from 10—4, except on Saturday.

A course of practical instruction in the methods of biological research, and on the structure of the leading animal types, will be conducted under the supervision of the Professor.

A class will be formed to undertake the original investigation of some special subject, or the complete study of some small group of animals.

Arrangements are made for obtaining such specimens as may be required.

Students will find it convenient to provide themselves with a microscope of their own. Good working instruments can now be obtained at comparatively small cost; but it would be advisable for students to consult the Professor before purchasing, as the value of a microscope depends greatly upon the maker. A fee of 10s. a Term will be charged for the use of a College microscope. Each student is expected to



be provided with a set of the necessary dissecting apparatus.

## FEES IN GUINEAS—

	6 days a week.	4 days a week.	2 days a week.
For the Session ... ..	8	6	4
„ two Terms ... ..	6	4½	3
„ one Term ... ..	3	2	1½

**BOTANY.**

Professor, ADOLPH LEIPNER.

## FIRST AND SECOND TERMS.

Tuesdays, 11—I; Saturdays, 9—10.

## THIRD TERM.

Tuesday, Thursday, and Saturday, 9—11.

General Morphology, Anatomy, and Physiology of Plants.

The structure and life-history of the leading types of Cryptogams and Phanerogams.

This course covers the entire range of Botanical studies required for the Preliminary Scientific (M.B.) Examination and the Intermediate Examination in Science of the University of London.

Facilities will also be given to any student (Elementary or Advanced) for practical work in any special department of Botany.

The Botanical Garden, attached to the College, contains upwards of 1,000 different species of flowering plants, representing types of more than 120 different families; and, being at all times accessible to students, gives every opportunity for illustration and study.

Text-books.—*Text-book of Botany*, by Prantl and Vines; Sachs' *Text-book of Botany*; *Practical Botany*, Bower and Vines; *Elementary Instruction in Practical Biology* (Huxley and Martin). For field-work: Hooker's *Students Flora of the British Islands*, or Babington's *Manual of English Botany*.

Fee, £5 5s. for three Terms; £4 4s. for two consecutive Terms; £3 3s. for the first or second Term singly; £2 2s. for the third Term.

### **SPECIAL PRACTICAL INSTRUCTION IN FIELD AND GARDEN BOTANY.**

Professor, ADOLPH LEIPNER.

THIRD TERM ONLY.

Thursday, 3—5.

This Class is specially designed to meet the wants of those who cannot afford the time for a complete course of Botany, and yet desire to become practically acquainted with at least the structure and classification of the flowers in our gardens and fields. The processes of pollination, fertilization, distribution of fruits and seeds, relation of insects and flowers, &c., will also be discussed and illustrated.

The Class will meet every Thursday, from 3 to 5, during the third Term, commencing Thursday, May 1st.

Fee, £1 11s. 6d.

### **MODERN HISTORY.**

Professor, J. ROWLEY, M.A.

The Professor of Modern History will lecture twice a week during each of the three Terms of the Session. He will also hold two classes in each week. These classes are intended to be supplementary to the lectures; it is sought through them to give students an opportunity of acquainting themselves with particular passages of history as these are described in the works of the best accessible writers on the subject. Examinations may be held from

time to time during the Term, in addition to those specified in the Calendar,

The subject for the Session will be—The History of the Three Kingdoms from the outbreak of the Great War with Spain till the Fall of the Monarchy (1588–1649). This includes a considerable part of one of the special periods prescribed in the Honour School of Modern History at Oxford (now open to women without the obligation of residence). Special attention will be given to the beginnings and growth of British Imperial Power and Colonization, the affairs of Ireland, the manifestations of the Parliamentary spirit in England, the conflict in the Commons and throughout the country between the Crown and the parliamentary leaders, and the events of the First and Second Civil Wars.

The lectures will be given on Tuesdays and Thursdays, from 11 to 12. The classes will be held on Mondays and Wednesdays, from 11 to 12.

Text-book recommended.—Mr. Franck Bright's *History of England*.

Fee, £5 5s. for three Terms; £4 4s. for two consecutive Terms; £3 3s. for either the first or second Term; £2 2s. for the third Term.

### **SPECIAL ENGLISH COURSE FOR THE MATRICULATION EXAMINATION OF THE UNIVERSITY OF LONDON.**

Professor, J. ROWLEY, M.A.

Monday and Wednesday, 10—11.

A course of lectures in English History and Language, as required for the Matriculation Examination of the University of London, will be given during the Session, and will begin on 4th November.

Fee for the course, £4 4s.

**ENGLISH LITERATURE.**

Professor, J. ROWLEY, M.A.

The Professor of English Literature will lecture twice a week during the first and second Terms, and once a week during the third Term of the Session. He will also hold two classes in each week during all three Terms. In these classes he will read with those of the students who desire to do so the more remarkable literary works produced during the period which forms the subject of his lectures. Examinations may be held occasionally in Term in addition to those specified in the Calendar.

The subject for the Session will be—The mind of England as expressed in her Drama from the Restoration till the death of Addison, and in her General Literature from the Restoration till the death of Pope (1660–1744). This includes the career of Dryden, and the course of the Restoration Drama before and after him; the later writings in Prose and the greater writings in Verse of Milton; the career of Butler, and the works of the minor Poets and Wits contemporary with Dryden; the entire course of the writers, great and small, of the days of Anne and the earlier Hanoverian time;—embracing the best part of Milton's work and the whole of that of Dryden, Butler, Congreve, Swift, Addison, Pope, Prior, Arbuthnot, and Gay.

The lectures will be given on Tuesdays and Thursdays, from 12 to 1, but during the third Term on Tuesdays only. The classes will be held on Mondays and Wednesdays, from 12 to 1.

Text-book recommended.—Arnold's *Manual of English Literature*.

Fee, £5 5s. for three Terms; £4 4s. for two consecutive Terms; £3 3s. for either the first or second Term; £1 11s. 6d. for the third Term.

## **SPECIAL INSTRUCTION IN ENGLISH HISTORY AND ENGLISH LITERATURE.**

Professor, J. ROWLEY, M.A.

Tuesday and Thursday, 9.45—10.45.

Special instruction, beginning on the first Tuesday in the second Term, and continued during the Session, in the supplementary subjects of Group H, or in the subjects of Group A of the Cambridge Higher Local Examination, or in those of the English Honour Section of the Oxford Examination for Women, will be offered to students attending the ordinary classes in Modern History or English Literature, and to such other students of the College as may satisfy the requirements of the Professor.

Fee for the course, £3 3s.

## **GREEK.**

Professor, R. FANSHAWE, M.A.

Lecturer, F. BROOKS, M.A.

There will be an Elementary and an Advanced Greek Class. The Elementary Class will meet on Tuesdays, Thursdays, and Saturdays, at 12; the Advanced on Mondays, Wednesdays, and Fridays, at 4.

The Elementary Class is intended for beginners and second year students; the Advanced Class for those preparing for the Arts Examinations of the University of London.

Fee, £5 5s. for three Terms; £4 4s. for two consecutive Terms; £3 3s. for the first or second Term singly; £2 2s. for the third Term.

**LATIN.**

Professor, R. FANSHAWE, M.A.

Lecturer, F. BROOKS, M.A.

The arrangements will be the same as those adopted in Greek. The Elementary Class will meet on Tuesdays, Thursdays, and Saturdays at 11; the Advanced on Mondays, Wednesdays, and Fridays, at 3.

Fee, £5 5s. for three Terms; £4 4s. for two consecutive Terms; £3 3s. for the first or second Term singly; £2 2s. for the third Term.

**SPECIAL GREEK AND LATIN CLASSES FOR THE  
MATRICULATION EXAMINATION OF THE  
UNIVERSITY OF LONDON.**

Professor, R. FANSHAWE, M.A.

Lecturer, F. BROOKS, M.A.

*Greek*—Tu., Th., Sat., 11.

*Latin*—Tu., Th., Sat., 10.

Middle Classes in Greek and Latin will be held at the above hours. The books read will be those prescribed for the June Matriculation Examination, for which special instruction will be given in Grammar, Composition, and Unseen Translation. These classes are also suited to those who are not yet able to join the Advanced Classes.

Fees, in each case, the same as for Elementary and Advanced Classes.



**HEBREW.**

Lecturer, BERNHARD HEYMANN.

A Class for beginners on Grammar and Construing will be held on Wednesdays and Fridays, from 2.30 to 3.30.

Instruction will be given to advanced students on Wednesdays and Fridays, from 3.30 to 4.30. Parts of the Book of Isaiah will be read, and occasional lectures will be given on Grammar and the earlier commentators.

Text-books may be obtained at the Secretary's Office.

Fee, £5 5s. for three Terms; £4 4s. for two consecutive Terms; £3 3s. for the first or second Term singly; £2 2s. for the third Term.

**FRENCH LANGUAGE AND LITERATURE.**

Lecturer, EUGÈNE PELLISSIER, M.A., LL.B., B.Sc.

Instruction will be given in the French Language and Literature every Monday, Tuesday, and Thursday. Advanced Class on Mondays from 9 to 10, and on Tuesdays and Thursdays from 2.30 to 3.30; Elementary Class on Tuesdays and Thursdays from 3.30 to 5.

In the Advanced Class lectures on French Literature from A.D. 1650 to 1700 will be delivered in French every Monday.

Text-books.—Advanced Class: *French Syntax*, E. Pellissier (Rivington); *The graduated course of translation, Part II., Senior Course*, Cassal and Karcher; Victor Hugo, *Les Misérables*, Vol. II. (Williams and Norgate).

Elementary Class: *French Accidence*, E. Pellissier (Rivington); *The graduated course of translation, Part I., Junior Course*, Cassal and Karcher; Edmond About, *Le Roi des Montagnes* (Hachette).

Those who wish to enter for the Cambridge Higher Local Examination will be directed in their studies of the books recommended for it, especially Brachet, *Historical French Grammar*, and Gêruzez, *Histoire de la Littérature Française*.

Fee, £5 5s. for three Terms; £4 4s. for two consecutive Terms; £3 3s. for the first or second Term singly; £2 2s. for the third Term.

## GERMAN LANGUAGE AND LITERATURE.

Lecturer, ADOLPH LEIPNER.

Instruction will be given in the German Language and Literature every Monday, Wednesday, and Friday. Elementary Class from 3 to 4; Advanced Class from 4 to 5.

In the Advanced Class occasional Lectures on some Authors, or a period of German Literature, may be delivered in German.

Text-books.—Advanced Class: Eve's *German Grammar*; Lange's *German Composition*; *Selections from Modern Authors*.

Elementary Class: Dr. A. L. Meissner's *Public School German Grammar* (Hachette and Co.); Whitney's *German Reader* (Macmillan and Co.).

Those who wish to enter for the Cambridge Higher Local Examination will be directed in their studies of the books recommended, especially: Gostwick and Harrison, *Outlines of German Literature*; Gelbe, *Deutsche Sprachlehre*; Vilmar, *Geschichte der deutschen Nationalliteratur*; Roquette, *Geschichte der deutschen Dichtung*.

Fee, £5 5s. for three Terms; £4 4s. for two consecutive Terms; £3 3s. for the first or second Term singly; £2 2s. for the third Term.

## HARMONY AND COUNTERPOINT.

Lecturer, CEDRIC BUCKNALL, Mus. Bac. Oxon.

SECOND AND THIRD TERMS.

Wednesday and Friday, 3.30—4.30.

Concords; essential, fundamental, and suspended discords. Modulation, &c. Counterpoint in 2 and 3 parts.

The object of this course is to give such a knowledge of Harmony and Counterpoint as is required by students of practical music, and also to aid candidates in preparation for the Royal Academy Local and other Examinations.

The exercises will be taken principally from Goss's "Harmony."

Fee, £3 3s. for two Terms; £2 2s. for one Term.

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# GENERAL TIME TABLE OF DAY CLASSES.

	Monday	Tues- day.	Wednes- day.	Thurs- day.	Friday.	Satur- day.
CHEMISTRY—Junior Class (1, 2) .. ..	—	—	11	—	11	—
“ Senior Class (1, 2) .. ..	9	—	9	9	—	10
“ Advanced Class .. ..	—	—	—	—	—	9
“ Organic (2) .. ..	—	10	—	10	—	—
“ “ (3) .. ..	10	—	10	—	10	—
“ Laboratory Instruction .. ..	10 to 5	10 to 5	10 to 5	10 to 5	10 to 5	—
“ Analytical (1, 2) .. ..	10	—	—	—	—	—
PRACTICAL PHOTOGRAPHY .. .. (d)	—	—	—	—	—	—
MATHEMATICS—Elementary .. ..	12	—	12	—	12	—
“ Intermediate .. ..	—	†11	—	†11	10	—
“ Advanced .. ..	—	†10	—	†10	11	—
“ Special Course .. ..	11	—	11	—	—	11
“ Tutorial Class .. ..	—	—	2.30 to 4	—	—	—
“ Mixed .. ..	—	12	—	12	—	—
EXPERIMENTAL PHYSICS—						
Elementary .. ..	—	12	—	12	—	—
Exercise Class .. ..	*11	—	—	—	—	—
Intermediate .. ..	—	—	11	—	11	—
Advanced (1, 2) .. ..	4	—	4	—	—	—
Technical (3) .. ..	4	—	4	—	—	—
Electrical Measurement .. ..	—	—	—	—	4	—
Laboratory Instruction .. ..	10 to 5	10 to 5	10 to 5	10 to 5	10 to 5	—
ENGINEERING—1st year (1) .. ..	—	12	—	12	—	—
“ “ (2, 3) .. ..	—	10	—	10	—	—
“ 2nd year (1) .. ..	—	10	—	10	—	—
“ “ (2) .. ..	—	12	—	12	—	—
“ “ (3) .. ..	12	—	—	—	12	—
“ 3rd year .. ..	12	—	—	—	12	—
“ Laboratory Instruction .. ..	} Open d		—	—	—	—
“ Workshop .. ..			—	—	—	—
MACHINE DESIGN & DRAWING (1, 2) ..	†2 to 4	—	—	—	†2 to 4	—
GEOMETRICAL DRAWING (1, 2) .. ..	—	*2 to 4	—	*2 to 4	—	—
SURVEYING—Elementary (3) .. ..	—	—	*2 to 5	—	2 to 4	—
“ Advanced (3) .. ..	—	*2 to 4	—	*2 to 4	—	—
GEOLOGY—General (1, 2) .. ..	4	—	4	—	4	—
“ Applied (1, 2) .. ..	—	—	12	—	12	—
“ Tertiary (1) .. ..	—	—	3	—	—	—
“ Laboratory Instruction .. ..	10 to 4	10 to 4	10 to 4	10 to 4	10 to 4	—
MINERALOGY AND LITHOLOGY .. .. (d)	—	—	—	—	—	—
PALÆONTOLOGY .. .. (d)	—	—	—	—	—	—
ZOOLOGY—Special .. ..	—	†2.30 to 5	—	†2.30 to 5	—	—
NATURAL HISTORY (2) .. ..	—	—	3	—	—	—
COMPARATIVE ANATOMY (3) .. ..	9	—	9	—	9	—
BIOLOGY—Laboratory Instruction .. ..	10 to 4	10 to 4	10 to 4	10 to	10 to 4	—
BOTANY (1, 2) .. ..	—	†11 to 1	—	—	—	†9 to 10
“ (3) .. ..	—	†9 to 11	—	†9 to 11	—	†9 to 11
“ Field and Garden—Special (3) ..	—	—	—	3 to 5	—	—
MODERN HISTORY .. ..	*11	11	*11	11	—	—
ENGLISH LITERATURE .. .. (a)	*12	12	*12	12	—	—
ENGLISH COURSE—Special .. .. (b)	10	—	10	—	—	—
ENGLISH HISTORY AND LITERA- TURE—Special .. .. (c)	—	9.45	—	9.45	—	—
GREEK—Elementary .. ..	—	*12	—	*12	—	*12
“ Middle (Special) .. ..	—	*11	—	*11	—	*11
“ Advanced .. ..	*4	—	*4	—	*4	—
LATIN—Elementary .. ..	—	*11	—	*11	—	*11
“ Middle (Special) .. ..	—	*10	—	*10	—	*10
“ Advanced .. ..	*3	—	*3	—	*3	—
HEBREW—Elementary .. ..	—	—	*2.30	—	*2.30	—
“ Advanced .. ..	—	—	3.30	—	†3.30	—
FRENCH—Elementary .. ..	—	*3.30 to 5	—	*3.30 to 5	—	—
“ Advanced .. ..	9	*2.30	—	*2.30	—	—
GERMAN—Elementary .. ..	*3	—	*3	—	*3	—
“ Advanced .. ..	*4	—	*4	—	*4	—
HARMONY AND COUNTERPOINT (2, 3) ..	—	—	3.30	—	3.30	—

The figures 1, 2, 3 indicate the Terms during which the Courses are held. Where there is no figure they are held throughout the Session.

The instruction in the hours which are marked with \* will take the form of class teaching.

The instruction in the hours which are marked with † will in some part take the form of class teaching.

(a) During the Session, but in the third Term only one lecture a week (on Tuesdays) and classes;  
 (b) beginning 4th November, in preparation for the Matriculation Examination of the University of London;  
 (c) beginning 21st January, in preparation for the Cambridge University Higher Local Examination, or the Oxford University Examination for Women; (d) by special arrangement.

DEPARTMENT OF ENGINEERING

AND THE

CONSTRUCTIVE PROFESSIONS.

## Department of Engineering and the Constructive Professions.

The instruction in this Department is designed to afford a thorough scientific education to students intending to become Engineers, or to enter any of the allied professions, and to supplement the ordinary professional training by systematic technical teaching.

The courses for Civil Engineers, Architects, and Surveyors are intended to meet the generally acknowledged want of a preparatory training for one or two years before the usual entrance as articled pupil into an office. Pupils are now usually articled for the comparatively short term of three years, and this scheme possesses the advantage of utilising the interval between leaving school and entering the office. These particular courses extend throughout the whole Session; but the Summer Term of each year is specially devoted to subjects which involve field work, and enable excursions to be taken to neighbouring works of construction illustrating the lectures.

Arrangements have now been made whereby students will be enabled to spend a short period of six months in Works during their College career.

It will be found that the detailed courses cover most of the ground of the Examinations which are now held by the Royal Institution of British Architects, and to a rather less degree those which qualify for admission as a Student, Associate, or Fellow of the Surveyors' Institution.

The schemes of study for Mechanical and Electrical Engineers, which extend over three years, are detailed hereafter. Special arrangements are made



to meet the needs of those who intend to spend one year only in the College.

Although the courses for the several branches of the profession are not obligatory, yet it is recommended that they be taken as hereafter detailed, and a substantial reduction is made in the case of students who take the complete course. Any reasonable change or modification which a student may desire will be made upon application.

The Engineering Laboratory is provided with a powerful Testing Machine, capable of exerting upon the test-piece a force of fifty tons. By means of this machine, local Engineers are enabled to have important materials, iron, steel, &c., tested in Bristol, instead of sending them to London, as heretofore.

Professor Ryan will be ready to give advice to students intending to join any of the courses.

Attention is specially directed to Regulation (6) of the General Regulations, p. 30, which provides that a report of the attendance of any student will be periodically sent to his parents or guardians, if they require it.

The Scholarships hereafter mentioned are open to students in all the branches of the profession.

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### **COURSE FOR STUDENTS INTENDING TO BECOME CIVIL ENGINEERS OR SURVEYORS.**

The course of Civil Engineering has been arranged to extend over two years, according to the following time-table; but special arrangements will be made for students who may deem it advisable to remain for a third year.

## TIME TABLE.

First Year.					Second Year.				
First and Second Terms.		Third Term.			First & Second Terms.		Third Term.		
MONDAY.	TUESDAY.	WEDNESDAY.	THURSDAY.	FRIDAY.	SATURDAY.				
Physics (Class), 11-12. Mathematics, 12-1. Eng. Drawing, 2-4.	Engineering,* 10-11. Physics, 12-1. Geom. Drawing, 2-4.	Chemistry, 11-12. Mathematics, 12-1. Mathematics, 2.30-4.	Engineering,* 10-11. Physics, 12-1. Geom. Drawing, 2-4.	Chemistry, 11-12. Mathematics, 12-1. Eng. Drawing, 2-4.					
Physics (Class), 11-12. Mathematics, 12-1. Workshop, 2-5.	Engineering, 10-11. Physics, 12-1. Workshop, 2-5.	Mathematics, 12-1. Surveying, 2-5.	Engineering, 10-11. Physics, 12-1.	Mathematics, 12-1. Surveying, 2-4.	Workshop, 10-1.				
Workshop, 10-1. Eng. Drawing, 2-4.	Engineering, 10-11. Mathematics, 11-12. Geom. Drawing, 2-4.	Physics, 11-12. Geology, 12-1. Workshop, 2-5.	Engineering, 10-11. Mathematics, 11-12. Geom. Drawing, 2-4.	Mathematics, 10-11. Physics, 11-12. Geology, 12-1. Eng. Drawing, 2-4.	Workshop, 9-11.				
Engineering, 12-1. Workshop, 2-5.	Workshop, 9-11. Mathematics, 11-12. Surveying, 2-4.	Physics, 11-12. Eng. Laboratory, 2-5.	Workshop, 9-11. Mathematics, 11-12. Surveying, 2-4.	Mathematics, 10-11. Physics, 11-12. Engineering, 12-1.	Workshop, 9-11.				

\*1st Year.—In the first Term Engineering will be held Tuesdays and Thursdays, 12-1.  
 2nd Year.—In the second Term Engineering will be held Tuesdays and Thursdays, 12-1.

FEES.—The compounded fee for the above course is, for each year, 28 guineas.

Arrangements have recently been made whereby our pupils may spend one short Term of six months in Works at a cost of £30.

Students while attending this course are eligible to be enrolled as Students of the Institution of Civil Engineers; and may then compete for the Miller Scholarship (value £40 per annum, tenable for three years) and the Miller prizes, which are awarded for original papers.

The following local Civil Engineers have expressed their approval of the course of instruction given in this Department. They also recommend it as a suitable preparation for persons intending to enter their offices as articled pupils, and in this capacity they will give preference to students of the Civil Engineering Department of the College:

Mr. FREDERICK ASHMEAD, Local Board of Health, Bristol.

Mr. H. PERCY BOULNOIS, City Surveyor, Exeter.

Mr. A. P. I. COTTERELL, Bristol.

Mr. J. W. GIRDLESTONE, Bristol Docks.

Mr. JAMES HENDERSON, Truro.

Mr. INGLIS, Great Western Docks, Plymouth.

Messrs. BUCHHOLZ, LEAN and METCALFE, Bristol.

Messrs. THOMAS and WILLIAM MORGANS, Bristol.

Mr. CHARLES RICHARDSON, Bristol. Severn Tunnel.

Mr. T. J. SCOONES, Bristol.

Mr. EDWARD SHAW; and

Mr. THOMAS WARING, Cardiff.

### **MINING ENGINEERING.**

Students of the College who intend to become Mining Engineers follow the above Course and Time-table; but special provision is made for their instruction in the third Term of each year.

### **COURSE FOR STUDENTS INTENDING TO BECOME ARCHITECTS.**

This course has been prepared for reasons already stated; but it is felt that the increasing use of iron in structures necessitates instruction specially bearing on this subject. At present the course, is therefore, similar to that in Civil Engineering, which it is thought will be the best fundamental training for those who can only spare one year from their technical work.

### TIME TABLE.

MONDAY.	TUESDAY.	WEDNESDAY.	THURSDAY.	FRIDAY.	SATURDAY.	First and Second Terms.	Third Term.
Mathematics, 12-1. Building Constrn. 2-4.	Technical Work, 10-11. Physics, 12-1. Geom. Drawing, 2-4.	Mathematics, 12-1. Workshop, 2-5.	Technical Work, 10-11. Physics, 12-1. Geom. Drawing, 2-4.	Mathematics, 12-1. Building Constrn. 2-4.	Workshop, 10-1.		
Mathematics, 12-1. Eng. Laboratory, 2-5.	Technical Work, 10-11. Physics, 12-1. Workshop, 2-5.	Mathematics, 12-1. Surveying, 2-5.	Technical Work, 10-11 Physics, 12-1. Workshop, 2-5.	Mathematics, 12-1. Surveying, 2-4.	Workshop, 10-1.		

In the first Term the Technical Work will be held Tuesdays and Thursdays, 12-1.

**FEES.**—The compounded fee for the above course is 25 guineas.

This course covers most of the ground in which examinations have now to be passed by any individual before he can be admitted as Associate or Fellow of the Royal Institute of British Architects.

The following local Architects give their hearty support to the scheme, to which they attach considerable importance. They are, moreover, prepared to receive students who have passed satisfactorily through this course into their office as pupils on more favourable terms than those without such preparatory training:

Mr. E. W. BARNES.  
Mr. W. L. BERNARD.  
Mr. J. BEVAN.  
Mr. F. BLIGH BOND.  
Mr. HENRY CRISP.  
Mr. E. HENRY EDWARDS.  
Messrs. FOSTER and WOOD.  
Mr. W. BRUCE GINGELL.  
Mr. EDWARD J. HANSOM.  
Mr. H. C. M. HIRST.  
Mr. W. EDWARD JONES.  
Mr. HENRY MASTERS.  
Mr. J. C. MONCRIEFF.  
Messrs. PHILIP MUNRO and SON.  
Messrs. POPE and PAUL.  
Mr. T. J. SCOONES.  
Mr. JOSIAH THOMAS.  
Mr. VINCENT W. VOISEY.  
Mr. HENRY WILLIAMS.  
Mr. F. W. WILLS.

### **COURSE OF MECHANICAL ENGINEERING.**

This course is carried on at the College during the six winter months, according to the following scheme:



## TIME TABLE.

MONDAY.	TUESDAY.	WEDNESDAY.	THURSDAY.	FRIDAY.	SATURDAY.
Workshop, 9-12. Mathematics, 12-1. Eng. Drawing, 2-4.	Engineering,* 10-11. Physics, 12-1. Geom. Drawing, 2-4.	Chemistry, 11-12. Mathematics, 12-1. Mathematics, 2.30-4.	Engineering,* 10-11. Physics, 12-1. Geom. Drawing, 2-4.	Workshop, 9-1. Chemistry, 11-12. Mathematics, 12-1. Eng. Drawing, 2-4.	Workshop, 11-1.
Workshop, 10-1. Eng. Drawing, 2-4.	Engineering, 10-11. Mathematics, 11-12. Geom. Drawing, 2-4.	Physics, 11-12. Workshop, 2-5.	Engineering, 10-11. Mathematics, 11-12. Geom. Drawing, 2-4.	Mathematics, 10-11. Physics, 11-12. Eng. Drawing, 2-4.	Workshop, 10-1.
Workshop, 10-12. Engineering, 12-1. Eng. Drawing, 2-4.	Mathematics, 10-11. Geom. Drawing, 2-4.	Eng. Laboratory, 10-1. Workshop, 2-4.	Mathematics, 10-11. Geom. Drawing, 2-4.	Mathematics, 11-12. Workshop, 10-12. Engineering, 12-1. Eng. Drawing, 2-4.	Workshop, 10-12.

\*1st Year.—In the first Term Engineering will be held Tuesdays and Thursdays, 12-1.  
 2nd Year.—In the second Term Engineering will be held Tuesdays and Thursdays, 12-1.

FEES.—The compounded fee for the above courses is, for each year, 20 guineas.

During the six summer months students of this course enter Engineering Works; and in accordance with this scheme the following Manufacturing Engineers in the neighbourhood have consented, at the request of the Council, to receive students of the College in their offices and workshops during the summer months, generally at reduced rates :

THE BRISTOL WAGON AND CARRIAGE WORKS CO., LIMITED.  
Messrs. BUSH and DE SOYRES, Bristol.  
Messrs. COX and Co., Shipbuilders, &c., Falmouth.  
Messrs. ELLACOTT and SON, Plymouth.  
Messrs. FIELDING and PLATT, Atlas Iron Works, Gloucester.  
THE ISCA FOUNDRY Co., Newport, Mon.  
Messrs. NEWALL and Co., Bristol.  
Mr. THOS. PECKETT, Atlas Engine Works, Bristol.  
Messrs. STOTHERT and PITT, Bath.  
Messrs. SPENCER and Co., Melksham, Wilts.  
Messrs. G. K. STOTHERT and Co., Bristol.  
THE USKSIDO Co., Newport, Mon.  
Messrs. JOHN WATTS and Co., Bristol.  
Messrs. WILLOUGHBY BROTHERS, Plymouth.

Engineering students can obtain a statement of the premium required on application to the Secretary, and any further information from the respective firms.

Students who have passed through this course are by the new regulations eligible to compete for the Whitworth Scholarships, since these regulations, an abstract of which is given, p. 151 require that any candidate must have worked at least six consecutive months in each of the three years in some Engineering Works.

Messrs. Stothert and Pitt, of Bath, have recently decided to make the College course an essential part of their curriculum; so that their Engineering pupils

will in future be required to attend lectures at the College during the winter months. The Bristol Wagon and Carriage Works Co., Limited, makes the same rule. Besides the local firms mentioned above, Engineers of eminence in other parts of the country consider the College training a fit and necessary preliminary to practical work.

### SHORT COURSE OF GENERAL ENGINEERING.

To meet the requirements of draughtsmen and others who cannot spare time to follow out any of the complete College courses, but who may wish to supplement their practical knowledge with a little theoretical instruction, the following scheme has been arranged for six months' work (October to April).

TIME TABLE.

MONDAY.	TUESDAY.	WEDNESDAY.
Engineering (3rd year), 12—1.	Mathematics, 10—11. Geom. Drawing, 2—4.	Mathematics, 2.30—4.
THURSDAY.	FRIDAY.	SATURDAY.
Mathematics, 10—11. Geom. Drawing, 2—4.	Mathematics, 11—12. Engineering (3rd year), 12—1.	

The compounded fee for this course is 12 guineas.

### ENGINEERING SCHOLARSHIPS.

An Engineering Scholarship of the value of £25 is competed for every year at the annual examinations at the end of the second or third Term. (See College Scholarships, page 16.)

Messrs. Buchholz, Lean and Metcalfe offer a scholarship every second year, which consists of free pupilage in their office for three years. This scholarship is reserved for those who are unable to pay the usual premiums, and is designed to enable such deserving students to obtain entrance into professional life. The nomination to this scholarship will be made by the Chairman of the College Committee on the results of the annual examinations in July, and will be subject to the approval of the donors.

Many of the local Engineering firms have recently consented to give Entrance Scholarships to their works. The nominations to these are made by the College Council. Some will be awarded on the results of the annual examinations at Easter, and others will be reserved for students who cannot afford to pay the usual premiums. The students nominated will get the combined College and Works' education for about £46 a year, whereas the ordinary premium paid by non-collegiate students in Works is £100 annually.

The following firms have kindly offered one or more of these special Scholarships:—

Messrs. STOTHERT & PITT, Bath.

THE BRISTOL WAGON AND CARRIAGE WORKS Co. Limited.

Messrs. COX & Co., Falmouth.

Messrs. NEWALL & Co., Bristol.

Messrs. BUSH & DE SOYRES, Bristol.

Messrs. JOHN WATTS & Co., Bristol.

THOMAS PECKETT, Atlas Engine Works, Bristol.

Messrs. SPENCER & Co., Melksham, Wilts.

Messrs. WILLOUGHBY BROTHERS, Plymouth.

Negotiations are still being made to bring closer the connection between the College and the leading Engineering works, and the precise number of Scholarships that will be available next Easter

cannot be accurately stated. In addition to nine first-class ones, there will probably be nine others, obtainable on less favourable terms.

In return for these concessions, the College Council has consented to allow any of the above-mentioned firms to send a deserving apprentice to the College to attend the day lectures at half fees.

### **COURSE OF ELECTRICAL ENGINEERING.**

This course has been arranged for students studying for the profession of Electrical Engineering, and for those who wish to include in their professional training some knowledge of Electricity and its technical applications, especially with regard to Electric Lighting and Transmission of power, Telephones and Telephonic Systems, Telegraphy, Electroplating, &c. Many of the subjects of the general Engineering course are included, together with Electricity and Magnetism, and practical instruction in the Electrical Laboratory.

It should be borne in mind that an Electrical Engineer must, in addition to his knowledge of Electricity, have a thorough acquaintance with practical Engineering. A mere knowledge of Testing and Laboratory Work is not sufficient to enable a student to become an Electrical Engineer. All students who enter for this branch should therefore arrange with some firm, either of Electrical or of Mechanical Engineers, for a course of training in Engineering Works.

Arrangements have lately been made whereby students will be enabled to spend one or two Terms of six months in Works during their College career.

**FEE.**—The compounded fee for these courses is, for each year, 28 guineas.

## TIME TABLE.

First Year.					Second Year.				Third Year.		
First and Second Terms.		Third Term.			First & Second Terms.		Third Term.		First & Second Terms.		Third Term.
SATURDAY.		FRIDAY.			THURSDAY.		WEDNESDAY.		TUESDAY.		MONDAY.
		Chem. Laboratory, 10-12. Chemistry, 11-12. Mathematics, 12-1. Chem. Laboratory, 2-5.	Chem. Laboratory, 10-12. Mathematics, 12-1. Phys. Laboratory, 2-5.		Engineering,* 10-11. Physics, 12-1. Geom. Drawing, 2-4.	Phys. Laboratory, 10-12. Physics, 12-1. Workshop, 2-5.	Chem. Laboratory, 10-12. Mathematics, 12-1.	Chem. Laboratory, 10-12. Mathematics, 12-1.	Engineering,* 10-11. Physics, 12-1. Geom. Drawing, 2-4.	Chem. Laboratory, 10-12. Physics, 12-1. Workshop, 2-5.	Physics (Class), 11-12. Mathematics, 12-1. Chem. Laboratory, 2-5.
Workshop, 10-1.		Chem. Laboratory, 10-12. Mathematics, 12-1. Phys. Laboratory, 2-5.	Chem. Laboratory, 10-12. Mathematics, 12-1. Phys. Laboratory, 2-5.		Engineering, 10-11. Mathematics, 11-12. Geom. Drawing, 2-4.	Phys. Laboratory, 10-12. Physics, 12-1. Workshop, 2-5.	Chem. Laboratory, 10-12. Mathematics, 12-1.	Chem. Laboratory, 10-12. Mathematics, 12-1.	Engineering, 10-11. Physics, 12-1. Geom. Drawing, 2-4.	Chem. Laboratory, 10-12. Physics, 12-1. Workshop, 2-5.	Physics (Class), 11-12. Mathematics, 12-1. Chem. Laboratory, 2-5.
		Mathematics, 10-11. Physics, 11-12. Eng. Drawing, 2-4.	Mathematics, 10-11. Physics, 11-12. Eng. Drawing, 2-4.		Engineering, 10-11. Mathematics, 11-12. Geom. Drawing, 2-4.	Phys. Laboratory, 10-12. Physics, 12-1. Workshop, 2-5.	Chem. Laboratory, 10-12. Mathematics, 12-1.	Chem. Laboratory, 10-12. Mathematics, 12-1.	Engineering, 10-11. Physics, 12-1. Geom. Drawing, 2-4.	Chem. Laboratory, 10-12. Physics, 12-1. Workshop, 2-5.	Physics (Class), 11-12. Mathematics, 12-1. Chem. Laboratory, 2-5.
		Mathematics, 10-11. Physics, 11-12. Elec. Laboratory, 2-5.	Mathematics, 10-11. Physics, 11-12. Elec. Laboratory, 2-5.		Engineering, 10-11. Mathematics, 11-12. Geom. Drawing, 2-4.	Phys. Laboratory, 10-12. Physics, 12-1. Workshop, 2-5.	Chem. Laboratory, 10-12. Mathematics, 12-1.	Chem. Laboratory, 10-12. Mathematics, 12-1.	Engineering, 10-11. Physics, 12-1. Geom. Drawing, 2-4.	Chem. Laboratory, 10-12. Physics, 12-1. Workshop, 2-5.	Physics (Class), 11-12. Mathematics, 12-1. Chem. Laboratory, 2-5.
		Mathematics, 11-12. Workshop, 10-12. Engineering, 12-1. Elec. Laboratory, 2-5.	Mathematics, 11-12. Workshop, 10-12. Engineering, 12-1. Elec. Laboratory, 2-5.		Engineering, 10-11. Mathematics, 11-12. Geom. Drawing, 2-4.	Phys. Laboratory, 10-12. Physics, 12-1. Workshop, 2-5.	Chem. Laboratory, 10-12. Mathematics, 12-1.	Chem. Laboratory, 10-12. Mathematics, 12-1.	Engineering, 10-11. Physics, 12-1. Geom. Drawing, 2-4.	Chem. Laboratory, 10-12. Physics, 12-1. Workshop, 2-5.	Physics (Class), 11-12. Mathematics, 12-1. Chem. Laboratory, 2-5.
Workshop, 10-1.		Mathematics, 11-12. Workshop, 10-12. Engineering, 12-1. Elec. Laboratory, 2-5.	Mathematics, 11-12. Workshop, 10-12. Engineering, 12-1. Elec. Laboratory, 2-5.		Engineering, 10-11. Mathematics, 11-12. Geom. Drawing, 2-4.	Phys. Laboratory, 10-12. Physics, 12-1. Workshop, 2-5.	Chem. Laboratory, 10-12. Mathematics, 12-1.	Chem. Laboratory, 10-12. Mathematics, 12-1.	Engineering, 10-11. Physics, 12-1. Geom. Drawing, 2-4.	Chem. Laboratory, 10-12. Physics, 12-1. Workshop, 2-5.	Physics (Class), 11-12. Mathematics, 12-1. Chem. Laboratory, 2-5.
		Mathematics, 11-12. Engineering and Elec. Laboratory, 10-4.	Mathematics, 11-12. Engineering and Elec. Laboratory, 10-4.		Engineering, 10-11. Mathematics, 11-12. Geom. Drawing, 2-4.	Phys. Laboratory, 10-12. Physics, 12-1. Workshop, 2-5.	Chem. Laboratory, 10-12. Mathematics, 12-1.	Chem. Laboratory, 10-12. Mathematics, 12-1.	Engineering, 10-11. Physics, 12-1. Geom. Drawing, 2-4.	Chem. Laboratory, 10-12. Physics, 12-1. Workshop, 2-5.	Physics (Class), 11-12. Mathematics, 12-1. Chem. Laboratory, 2-5.

\* 1st Year. — In the first Term Engineering will be held Tuesdays and Thursdays, 12-1.  
2nd Year. — In the second Term Engineering will be held Tuesdays and Thursdays, 12-1.



**EVENING COURSE OF MECHANICAL ENGINEERING.**

This course, which extends over two years, is arranged for the instruction and training of Engineers' pupils and apprentices and others, who are engaged in the office or works during the daytime, but who wish to avail themselves of systematic "Technical Instruction" in Mechanical Engineering and its cognate subjects.

In each individual course, twenty lectures or classes at least will be held during the first and second Terms, and may, if necessary, be continued during the early portion of the third Term.

The course is adapted to the requirements of candidates who intend to compete for Whitworth Scholarships and Whitworth Exhibitions,\* and Royal Scholarships and Exhibitions of the Science and Art Department.

The course will be constituted as follows :

**FIRST YEAR.**

Mathematics.  
Experimental Physics.  
Applied Mechanics.  
Theoretical Mechanics.  
Engineering Drawing.  
Steam and the Steam Engine.

**SECOND YEAR.**

Mathematics.  
Experimental Physics.  
Advanced Geometry.  
Applied Mechanics.  
Machine Design.  
Chemistry.

\* In 1890 there are about 25 Exhibitions of £50; and 4 Scholarships of £125, tenable for three years.

The first year course, commencing in October next, is so arranged that students will be required to attend at the College from 7 to 9 on four evenings per week, making a total of eight hours per week. The second year course will need an attendance of about eight hours per week also.

At the end of the course, students who have attended regularly, and made satisfactory progress, will receive a College Certificate of Engineering.

## TIME TABLE.

## FIRST YEAR.

MONDAY.	TUESDAY.	WEDNESDAY.	THURSDAY.	FRIDAY.
Mathematics, 7—8.		Mathematics, 7—8.	Theoretical Mechanics, 7—8.	Machine Drawing, 7—8.
Electricity and Magnetism, 8—9.		Steam, 8—9.	Engineering, 8—9.	Geometry, 8—9.

## SECOND YEAR.

Mathematics, 7—8.		Mathematics, 7—8.		Machine Design, 7—8.
Physics, 8—9.		Chemistry, 8—9.	Engineering, 8—9.	Advanced Geometry, 8—9.
				Chemistry, 8—9.

Compounded Fee for each year's course, £2 2s.

# COURSE FOR THE PRELIMINARY SCIENTIFIC (M.B.) EXAMINATION OF THE UNIVERSITY OF LONDON.

The following course has been arranged for students preparing for this Examination:

TIME TABLE.

SUBJECT.	MONDAY.	TUESDAY.	WEDNESDAY	THURSDAY.	FRIDAY.	SATURDAY.
INORGANIC CHEMISTRY (1st and 2nd Terms.)	9-10	....	9-10	9-10	....	10-11
CHEMICAL LABORATORY (3rd Term).	10-1	....	10-1	....	10-1	....
INTERMEDIATE PHYSICS	....	....	11-12	....	11-12	....
BIOLOGY—						
ZOOLOGY .. .. .	....	2.30-5	...	2.30-5	....	....
BOTANY— (1st and 2nd Terms)	....	11-1	....	....	....	9-10
(3rd Term) .. .. .	....	9-11	....	9-11	....	9-11

*Note*.—For those taking the Intermediate Scientific (B.Sc.) Examination in addition to the above—Mathematics, Tuesday and Thursday, 11; and Friday, 10. Mechanics, Tuesday and Thursday, 12.

Compounded Fee—Twenty-seven Guineas.

The compounded fee for the above course is 18 guineas. A tutorial class (not included in the compounded fee) will be held by special arrangement.

# **COURSE FOR THE MATRICULATION EXAMINATION OF THE UNIVERSITY OF LONDON.**

The following course has been arranged for students preparing for this Examination:

**TIME TABLE.**

SUBJECT.	MONDAY.	TUESDAY.	WEDNES- DAY.	THURSDAY	FRIDAY.	SATURDAY.
LATIN .. .. .	....	10-11	....	10-11	....	10-11
GREEK .. .. .	....	11-12	....	11-12	....	11-12
GERMAN.. .. .	3-4	....	3-4	....	3-4	.. .
FRENCH.. .. .	....	3.30-5	....	3.30-5	.. .	....
ENGLISH .. .. .	10-11	....	10-11	....	....	....
MATHEMATICS .. .	12-1	....	12-1	....	12-1	....
MECHANICS .. .. (1st and 2nd Terms.)	....	12-1	....	12-1	....	....
HEAT AND LIGHT (2nd and 3rd Terms.)	....	12-1	....	12-1	..	....
MAGNETISM AND ELEC- TRICITY .. .. (1st and 2nd Terms.)	....	....	11-12	....	11-12	....
CHEMISTRY .. .. (1st and 2nd Terms.)	....	....	11-12	....	11-12	....

The compounded fee for the above course is 22 guineas.





SESSION 1889-90.

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EVENING LECTURES.

**GENERAL REGULATIONS.**

(1.) Persons under the age of 16 years, seeking admission as Evening students, will be required to obtain the permission of the Dean of the College.

(2.) Each student on admission must sign an undertaking to observe all the regulations affecting students made by the Council of the College for the time being.

(3.) The Secretary will attend at his office, for the purpose of admitting students, from 6.45 to 8.15 p.m., from October 9th to October 25th, 1889, January 21st to February 3rd, and from April 29th to May 6th, 1890, except on Saturdays.

(4.) The tickets of admission issued by the Secretary must be presented to the Professors and Lecturers for insertion of the student's name in the class lists. No student is entitled to attend the classes until he has obtained a ticket of admission.

(5.) A record will be kept of the attendance of students. A report of the attendance of any student will be periodically sent to his parents or guardians if they require it.

(6.) Any students of the College purposing to enter as candidates at any public examination shall obtain the consent of the Dean before giving in their names as entering from University College, Bristol.

(7.) Disorderly conduct on the part of any student will be reported to the Dean, who will adopt such action thereon as he may deem necessary.

(8.) Every student is required to provide himself with a College Calendar.

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*The Council reserve to themselves the power of suspending any Class, if there is not a sufficient number of entries.*

## RULES OF COLLEGE DISCIPLINE.

1. Students are required to behave in an orderly manner in all parts of the College building and grounds. Noisy behaviour in the students' cloak-room is especially forbidden.

2. All loitering in passages is forbidden, except when students are waiting for the opening of a lecture.

3. No smoking or carrying lighted pipes, &c., is permitted in the passages or about the entrances of the College.

4. Any wanton damage done to College property must be made good by the offender, and renders him liable to the undermentioned penalties.

5. The penalties attached to the breach of any of the above-mentioned rules are:

(1.) A fine proportionate to the offence.

(2) Suspension or expulsion from the College in case of more serious or repeated offences.

## FEEES.

All Fees are payable in advance.

The fees are as a rule:—For courses in which two hours of instruction are given in the week, 20/- for three Terms; 15/- for two Terms; 10/- for one Term. Some exceptions to this rule will be found in the statements of fees which are appended to the accounts given further on of the subjects of the several courses.

An entrance fee of 1/- is charged for each course;

but all entrance fees for one Session may be compounded for by a single payment of 3/-

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*A reduction in the rate of fees charged may be made on application, in certain exceptional cases.*

### GOVERNMENT AID TOWARDS THE INSTRUCTION OF SCIENCE TEACHERS.

In accordance with a minute adopted by the Right Honourable the Lords of the Committee of Her Majesty's Most Honourable Privy Council on Education, January, 1889 (Science Form No. 722), their Lordships are prepared to pay one-half the fees of the teachers selected to attend the Evening Classes on condition that satisfactory reports of their progress and conduct be received at the end of each of the first and second Terms.

Applications for this privilege must be made to the Secretary, Department of Science and Art, London, S.W.

The selection of the applicants will rest with the Department of Science and Art.

### EVENING CLASSES.

- (a) Chemistry.—One or both of the Classes.
- (b) Physics.—Any of the Lecture Classes not exceeding two in number.
- (c) Geology.—The Lecture Class.
- (d) Zoology.—The Lecture Class.
- (e) Botany.—The Lecture Class.

Further information may be obtained of the Secretary, University College, Bristol.

**EVENING CLASS SCHOLARSHIPS.**

Two Scholarships, each of the value of. £2 10s., will be awarded in July, 1890.

The subjects of examination and other information may be obtained on application to the Secretary.

**ORDINARY CERTIFICATES.**

Any student who diligently attends a course of instruction in any subject during a Session, and obtains a place in the first or second class in the Examination at the end of the course, shall be entitled to receive a certificate from the College. Ordinary certificates are not, however, granted for Elementary Classes in Languages.

## Evening Lectures.

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### SUBJECTS OF INSTRUCTION.

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#### CHEMISTRY.

Lecturer, ARTHUR RICHARDSON, Ph.D.

FIRST COURSE.—Wednesday and Friday, 8—9.

This course consists of two lectures a week during the first and second Terms. The subject includes the general principles of Chemistry and Chemical Physics, and the Chemistry of Non-metallic Elements. Special attention will be paid throughout to those products which have a practical application in the Arts and Manufactures. The lectures will be illustrated with experiments and diagrams. Examinations will be held from time to time during the course.

#### SYLLABUS.

PRINCIPLES OF CHEMISTRY AND CHEMICAL PHYSICS.—Elements, mixtures, and compounds. Separation of mixtures. Conservation of matter. Atomic theory. Laws of definite and multiple proportions. Combination of gases by volume. Laws of Boyle and Gay Lussac. Avogadro's hypothesis. Molecular and atomic weights. Analysis and synthesis of compounds. Quantivalence. Heat of combination. Methods of determining atomic weight.



THE NON-METALLIC ELEMENTS. — Hydrogen, Chlorine, Bromine, Iodine, and Fluorine. Compounds with Hydrogen. Oxygen, Sulphur, Selenium, and Tellurium. Combustion and Respiration. Compounds with Hydrogen. Water, Compounds of Chlorine group with Oxygen, Sulphur, &c. Acids, Bases, and Salts. Bleaching. Oxides and Oxy-acids of Sulphur, Selenium, and Tellurium. Sulphuric Acid manufacture. Nitrogen Phosphorus, Arsenic, Antimony. Compounds with Hydrogen. Ammonia, Compounds with Chlorine and Oxygen groups, Nitric Acid. Lucifer Matches. Manures. Detection of Arsenic in cases of poisoning. Arsenical Dyes. Boron and its compounds. Carbon and Silicon. Compounds with other elements. Fire-damp. After-damp. Ventilation. Illumination. Coal-gas.

This course covers the subjects prescribed for Matriculation in the University of London.

Text-books.—Roscoe's *Elementary Lessons on Chemistry*, or Thorpe's *Inorganic Chemistry*; Thorpe's *Chemical Problems*.

Fee, 15/- for two Terms; 10/- for one Term.

SECOND COURSE.—Wednesday, 7—8.

This course consists of one lecture a week during the first and second Terms.

#### SYLLABUS.

REVIEW OF THEORIES DESCRIBED IN FIRST COURSE, AND OF NON-METALLIC ELEMENTS.—Abnormal Vapour Densities. Dissociation. Atomic and Molecular Heats. Crystallography. Isomorphism. The Periodic Law. The Metals. Classification. Equivalents. Quantivalence. General Properties of the Metals, Physical and Chemical. Special Properties and Methods of Preparation of the more important Metals. Compounds of Metals.

Oxides and Hydroxides. Salts. Chlorides. Bromides. Iodides. Fluorides. Cyanides. Hypochlorites. Chlorates. Perchlorates. Sulphides. Sulphates. Alums. Sulphites. Thiosulphates. Nitrates. Phosphates. Arsenates. Borates. Silicates. Glass and Earthenware. Mortar and Cements. Building Materials. Carbonates. Detection of the Metals. Spectrum Analysis.

Those compounds which are of Technical importance will be treated most fully.

Fee, 15/- for two Terms; 10/- for one Term.

The lectures will not be delivered unless there is a sufficient number of entries.

## CHEMISTRY AS APPLIED TO SOAPS AND CANDLES.

Professor, SYDNEY YOUNG, D.Sc.

A course of about ten lectures, illustrated by experiments and diagrams, will be delivered on Monday evenings, at eight o'clock, during the first Term, on the Chemistry of Soaps and Candles.

### SYLLABUS.

Carbon, Hydrogen, Oxygen, Chlorine, Sodium, Potassium, Silicon, Aluminium. Combination of Oxygen with Hydrogen, Carbon, Sodium, and other elements.

*Water.*—Carbon dioxide; Sodium Oxide and Caustic Soda; Composition and Properties of these compounds.

*Natural Waters.*—The impurities and the purification of Natural Waters. Hard and soft Waters. Estimation of Hardness of Water.

*Acids.*—Bases, Alkalies, Lyes; Salts. Chief characteristics of these groups of compounds, and special properties of those employed in the manu-

facture of Soaps and Candles. Analysis of some of these compounds. Alcohols, including Glycerine. Ethers, including Fats and Oils. Paraffins. Wax.

General Properties of Alcohols, Ethers and Paraffins. Action of Alkalies on Ethers. Saponification. Chemical changes involved in the various processes employed in the manufacture of Soaps and Candles.

Fee, 10/-.

### CHEMISTRY AS APPLIED TO THE ART OF POTTING.

Lecturer, ARTHUR RICHARDSON, Ph.D.

A course of lectures to practical Potters and others will be delivered on Mondays, at eight o'clock, during the second Term.

#### SYLLABUS.

The Chemical nature and composition of Clays—Bodies—Glazes—Fluxes—Colours—Enamels—Chemical changes they undergo at different temperatures—Expansion and Contraction—Crazing—Combustion—Fuel—Sulphur in Fuel; its detection—Firing—Practical methods for measuring high temperatures—Simple Analysis of raw materials used in potting—Detection of impurities and adulterations.

Fee, 5/-.

#### CHEMICAL EXCURSIONS.

In order that students may have an opportunity of acquiring some knowledge of applied Chemistry, excursions to some of the mines and manufactories of the neighbourhood will occasionally be made. They will be conducted by the Professor or Lecturer. Past or present students of the College desirous of taking part in these excursions are invited to apply to the Professor of Chemistry.

**PHOTOGRAPHIC CHEMISTRY.**

Lecturer, A. RICHARDSON, Ph.D.

Fridays, 7—8.

A course of lectures will be delivered on Chemical principles applied to Photographic processes.

In this course the Chemical principles involved in the more important Photographic processes will be considered, in which will be included the various Silver processes, as well as those in which Salts of Chromium, Iron, Platinum, &c., are used.

Special attention will be given to the Chemistry of Development, Toning, and Fixing.

The course will not be held unless there is a sufficient number of entries.

Fee, 15/- for two Terms; 10/- for one Term.

**MATHEMATICS.**

Professor, D. C. SELMAN.

Monday and Wednesday, 7—9.

There will be an Elementary and an Advanced course of lectures.

*Elementary Course.*—Arithmetic, Euclid, Algebra, and Trigonometry.

*Advanced Course.*—Higher Algebra, Euclid, Trigonometry, Conic Sections, Spherical Trigonometry, and Differential and Integral Calculus.

These courses will meet the requirements of students preparing for the Oxford and Cambridge, University of London, Science and Art Department, and Assistant Teachers' Examinations.

Students in these classes may attend either on Mondays or Wednesdays.

Fee for either course, 20/- for three Terms; 15/- for two consecutive Terms; 10/- for one Term.

## THEORETICAL MECHANICS.

Professor, D. C. SELMAN.

Thursday, 7—8.

### STATICS.

*Statics of a Particle.*—Measurement and Graphic Representation of Force. Parallelogram, Triangle, and Polygon of Forces. Moments about a Point and Line. Conditions of Equilibrium. Statics of a System of Particles. Resultant of two or more Parallel Forces. Conditions of Equilibrium. Couples. Parallelogram Law of Couples. Central Axis.

*Statics of Constrained Bodies.*—Bending Moments. Loaded Beams. Funicular Polygon. Stress Diagrams.

*Theorems relating to Centre of Mass.*—Centroid of a Triangle, Pyramid, Arc of Circle. Theorems of Pappus.

*Friction.*—Laws of Friction. Limiting Friction. Tension of a string on rough curve. Rolling Friction.

*Machines.*—Lever, Wheel and Axle, Systems of Pulleys, Inclined Plane, Screw, Steelyard, Roberval's Balance, Differential Combinations.

### DYNAMICS.

*Dynamics of a Particle.*—Kinematics, Laws of Motion, Parallelogram of Velocities and Accelerations. Relative Motion. Force. Mass. Density. Weight. Attwood's Machine. Value of "g." Gravitation. Units.

*Uniform and Uniformly Accelerated Motion.*—General Formulæ. Motion down inclined plane. Kinetic Energy and Work. Horse-power. Projectiles. Pendulum. Motion about a fixed axis.

### HYDROSTATICS.

*Fundamental Properties of Fluids.*—Density. Specific Gravity. Pressure at different points of a Fluid. Centre of Pressure. Transmission of Pressure. Syphon.

*Equilibrium of a Floating Body.*—Displacement. Surface of Buoyancy. Metacentre. Oscillations. Stability in General.

*Rotation of Fluids.*—Surfaces of Equal Pressure. Whole Pressure. Wave Motion. Vortex Motion.

Fee, 15/- for two Terms; 10/- for one Term.

### MECHANICAL ENGINEERING.

Lecturer, D. C. SELMAN, M. Inst. M.E.  
Assoc. M. Inst. C.E.

Thursday, 8—9.

*Strength of Materials.*—Simple Tension. Compression. Bending and Shearing. Working Strength. Factors of Safety. Ultimate Strength. Testing Machines. Properties of Materials. Behaviour of materials under stress.

*Statics of Structures.*—Graphic Statics. Stress Diagrams. The Funicular Polygon. Bending Moment Diagrams. Beams of uniform strength. Strength of Columns, Cranes, and Derricks. Sheer-legs. Chains.

*Properties of Materials.*—Plastic Materials. Flow of Solids. Hardness. Tempering. Mechanical Tests. Durability. Kinds and properties of Steel. Alloys. Case-hardening. Annealing.



*Dynamics of Machines.*—Work and Horse-power. Resistance. Friction. Rolling and Sliding Friction. Friction of Pivots. Brakes. Dynamometers. Governors. Fluctuation in General. Diagrams of position and velocity. Efficiency of Machines.

*Mechanism.*—Sketch of Reuleaux Theory of Machines. Crank-chains. Linkwork in General. Toothed Wheels. Bevel and Screw Gearing. Epicyclic Trains. Cams. Ratchets. Escapements. Machine Tools. Planing, Drilling, Slotting, and Boring Machines. Lathes. Screw Cutting. Copying principle in Machine Tools. True Plane Surfaces. Gauges. Measuring Machines.

*Hydraulic Machines.*—Pumps. Turbine Motors, Propellers, Reaction Wheels. Hydraulic Cranes. Hydraulic Engines. Impact. Dynamic Head. Efficiency.

Fee, 15/- for two Terms ; 10/- for one Term.

## ELECTRICITY AND MAGNETISM.

Professor, J. RYAN, M.A., D.Sc., LL.M.

Lecturer, LLEWELYN N. TYACK.

During the first and second Terms a course of twenty popular lectures will be delivered on Electricity and Magnetism, on Monday evenings, at 8 o'clock.

### SYLLABUS.

*Magnetism.*—Magnets, Natural and Artificial. Laws of Magnetic Force. The Compass and the Dipping Needle.

*Static Electricity.*—Electrical Machines. Electroscopes. Induction. Leyden Jars and other Condensers. Electrometers.

*Current Electricity.*—The Voltaic Cell. Batteries. Laws of Electromotive Force and of Resistance. Chemical Actions of the Current. Magnetic Actions of the Current. Electromagnets. Heating Effects of the Current. Induction Currents.

*Telegraphy and Telephony.*—Chief Types of Instruments. Duplex and Quadruplex Telegraphy.

*Electric Lighting.*—Construction of Dynamo-electric Machines for Generating Electric Currents. Electric Lamps. The Voltaic Arc. Incandescence Lights.

*Distribution and Storage of Electric Energy.*—Systems of Distribution. Accumulators or Storage Batteries. Electric Motors or Engines.

Text-book.—S. P. Thompson's *Electricity and Magnetism* (Macmillan and Co.)

Fee, 15/- for two Terms; 10/- for one Term.

## ELECTRICAL LABORATORY WORK.

Professor, J. RYAN, M.A., D.Sc., LL.M.

Demonstrator, LLEWELYN N. TYACK.

Systematic instruction in Laboratory work will be given on Thursday evenings, from 7 to 9 p.m., by the Professor and Demonstrator during the first and second Terms.

There will be two courses: an elementary one for junior students, and an advanced course for those already accustomed to electrical work.

*Elementary Laboratory Course.*—Construction of Simple Apparatus—Electroscopes, Leyden Jars, Induction Apparatus, &c. Mode of Measuring Quantity and Density of Charge, Insulation and Inductive Capacity. Use of Electrical Machines. Management of Voltaic Batteries. Construction and

Use of Galvanometers. Experiments with Batteries, Induction Coils, Telegraphic and Telephonic Apparatus.

Students attending this course will be taught how to make various pieces of apparatus for themselves, and they will be expected to furnish the materials at their own expense, which will not exceed a few shillings; such apparatus remaining as their own property.

*Advanced Laboratory Course.*—Measurement of Resistance, Electromotive Force, &c. Use of Resistance Coils, Wheatstone's Bridge, Galvanometers and Electro-dynamometers. Use of Condensers. Construction and Use of Dynamo-electrical Machines. Management of Electric Arc Lights and Incandescence Lamps. Measurement of Currents employed in Electric Lighting. Tests of Efficiency of Machinery and Lamps.

Fee, for two Terms, £1 11s. 6d.; for one Term, £1 1s.

## STEAM AND THE STEAM ENGINE.

Professor, J. RYAN, M.A., D.Sc., LL.M.

During the first and second Terms a course of twenty popular lectures will be delivered on the above subjects, on Wednesday evenings, at eight o'clock.

*Heat.*—The principal phenomena of Heat. The Development of Heat. The Conduction and Radiation of Heat. Convection of Heat. The Solid, Liquid, and Gaseous States of Matter. Expansion and Contraction. The Measurement of Temperature and Quantity of Heat. Thermometers, Pyrometers, Calorimeters. Specific Heat. Joule's equivalent. The elements of Thermodynamics. The theory of Heat Engines. Hot-air and Gas Engines.

*Steam.*—The formation of Vapour and Steam. The boiling-points of Fresh and Salt Water. Saturated Steam. Superheated Steam. The relations between the Pressure, Density, and Temperature of Steam. Condensation of Steam.

*Furnaces and Boilers.*—The different types. Fuel: solid, liquid, and gaseous. Boiler explosions.

*The Steam Engine.*—Its history and development. The Engines of Savary, Newcomen, and Watt. Watt's Inventions. Pumping Engines. Single-acting and Double-acting. High-pressure and Low-pressure. Compound Engines of different forms and arrangements. Triple and Quadruple Expansion. The various types of Steam Engines: Stationary, Locomotive, and Marine. Disc and Rotary Engines.

*Testing.*—Methods of measuring the duty and efficiency of Steam Engines. The Indicator. Nominal and Indicated Horse-power. Nett Horse-power, &c. Dynamometers. Other calculations and measurements.

*Theory.*—The behaviour of Steam in the Cylinder. Condensation and Re-evaporation. Compounding. Multiple expansion. The Steam Jacket. The distribution of Heat in the Cylinder. Theories of the Steam Engine.

Text-book.—*The Steam Engine*, by Goodeve (Crosby, Lockwood and Co.)

Fee, for two Terms, 15/-; 10/- for one Term.

## WORKSHOP.

Demonstrator, ALFRED E. MACKETT.

Monday and Thursday, 7—9.

Instruction will be given in the following subjects:—The use of Joiners' tools. Filing, fitting,

and turning. The use of the Forge and Smiths' tools, and the hardening and tempering of Steel. Moulding and casting of Gun-metal and other alloys on a small scale. Brazing and soldering. Hand turning. The use of the Self-acting Lathe for turning, boring, and screw-cutting. The preparation of Standard gauges, of plane surfaces, and of cutting tools.

Students may select either Mondays or Thursdays, to suit their convenience.

Fee, 21/- for two Terms ; 15/- for one Term.

### GEOMETRICAL DRAWING.

Lecturer, D. C. SELMAN, M. Inst. M.E.  
Assoc. M. Inst. C.E.

Demonstrator, ALFRED E. MACKETT.

Friday, 7—8.

An Elementary and Advanced course of lessons in Practical Plane and Solid Geometry will be given during the first and second Terms.

*Plane Geometry.*—The construction of Scales. The construction of Simple Figures. The combination of Figures. The transformation of Figures and Areas. Construction of Curves.

*Solid Geometry.*—Projections of Points and Lines. Traces of Lines and Surfaces. Projection of Simple Solid Forms. Sections and penetration of Simple Solids. Developments of Surfaces of Simple Solids, and drawing of Patterns and Templates for Boilers. Scale of Slope. Shadows. Graphic Arithmetic.

Fee for the course, together with that on Machine Design and Drawing, 15/- for two Terms ; 10/- for one Term.

**MACHINE DESIGN AND DRAWING.**

Lecturer, D. C. SELMAN, M. Inst. M.E.  
Assoc. M. Inst. C.E.

Demonstrator, ALFRED E. MACKETT.

Friday, 8—9.

An Elementary and Advanced course of lessons in Machine Drawing will be given during the first and second Terms.

The course of instruction will deal with the strength and form of Bolts and Nuts, Cotters, Shafting, Couplings, Cranks, Eccentrics, Pistons, Pedestals, Plumber Blocks and Bearings, Toothed and Belt Gearing, Valves of various kinds, Pipes, Pipe Joints, Glands, Air and Force Pumps, and the preparation of Tracings and Workings and Finished Drawings generally. Machine Design.

Students in the Drawing courses will also be expected to undertake exercises to be worked out during the week. They will be required to provide themselves with the necessary instruments.

Fee for the course, together with that on Geometrical Drawing, 15/- for two Terms: 10/- for one Term.

**GEOLOGY.**

Professor, C. LLOYD MORGAN.

Tuesday, 7.30—9.

A course of about twenty lectures will be given during the first and second Terms.

**SYLLABUS.**

The life of the world. The rocks of the earth's crust. Processes of Disintegration: the Waste of the Land. Processes of Re-construction: strata-



building. Processes due to internal changes: Volcanoes and Earthquakes. Earth-shrinkage: Elevation and Depression of the Land. Earth-sculpture: Denudation. Fossils and their Teachings. The Strata of Wales: the Age of Trilobites. The Strata in the neighbourhood of Bristol: the Age of Fishes. The Strata in the neighbourhood of Bath: the Age of Reptiles. The Strata in the neighbourhood of London: the Age of Mammals. Caves and River Drifts: the Dawn of the Age of Man.

Fee, 15/- for two Terms; 10/- for one Term.

### ZOOLOGY.

#### ANIMAL LIFE AND INTELLIGENCE.

Professor, C. LLOYD MORGAN.

Monday, 7.30—9.

A course of about twenty lectures will be given during the first and second Terms.

#### SYLLABUS.

The nature of Animal Life. The Process of Life. The Senses of Animals. Mental Processes in Man. Mental Processes in Animals: their Powers of Perception and Intelligence. The Feelings of Animals: their Appetites and Emotions. Animal Activities: Habits and Instincts. The Stress of Circumstances: Lamarckism. Reproduction and Heredity. The Struggle for Existence: Natural Selection. Development and Evolution. A Chain of Laws.

Fee, 15/- for two Terms; 10/- for one Term.

### BOTANY.

Professor, ADOLPH LEIPNER.

An elementary course of lectures on Structural and Physiological Botany, and on the classification,

technical description and identification of the wild plants of the neighbourhood, will be given every Tuesday, from 7 to 9, during the second and third Terms.

The Botanical Garden attached to the College is at all times accessible to the students, and gives every opportunity for illustration and study.

Text-books.—*Text-book of Botany*, by Prantl and Vines; Hooker's *Students' Flora of the British Islands*; or Babington's *Manual of English Botany*.

Fee, 15/- for two Terms; 10/- for one Term.

### ENGLISH LITERATURE.

Professor, J. ROWLEY, M.A.

Wednesday, 7.30—

During the first and second Terms a course of twenty lectures will be given on "the leading Poets of England and the work they did, whether in verse or in prose, between the birth and death of Wordsworth (1770—1850)." The varied life and manifestations of English Poetry and of such English Prose of the time as was written by the Poets will be described; and the best or specially characteristic compositions of those whose times of production lie within this period will be passed in review, and portions of them carefully examined. The latest efforts of the old order, and the productions of the poets that, living in the old order, were the forerunners of the new, will come under treatment; the significance of the last will be pointed out, and the extent of their influence estimated. Thus the poetical character and activity, the special power and place in poetry or in prose of Cowper and Blake, as well as of Rogers and Wordsworth, of Coleridge and Southey, of Scott and Byron, of Lamb and Landor, and of Shelley and Keats, will engage the attention

of the lecturer; and some account of the personal character and history of each will be given. The several influences that prevailed and the forces that were at work and determined the poetical types of the time will be investigated and their operations shown. And the critical theories or positions regarding their own craft maintained by some of those writers, especially by Wordsworth, Coleridge, and Shelley, will be explained and commented on. In fine, whatever is most characteristic, as well as whatever is presumably of enduring value, in "the burst of activity in our literature, through the first quarter of this century," will be distinguished and expounded.

Fee, 15/- for two Terms; 10/- for one Term.

### GREEK.

Professor, R. FANSHAWE, M.A.

Lecturer, F. BROOKS, M.A.

Monday, Wednesday, and Friday, 7—8.

The work of these classes will be arranged in three divisions: Elementary (Wednesday), Middle (Friday), and Advanced (Monday); in each of which instruction will be given in Translation, Grammar, and Composition. The authors to be read will be chosen with reference to the wants of the students who present themselves, provision being made, as far as circumstances allow, for candidates for the Examinations of the University of Oxford (now open to women), the Higher Local Examination of the University of Cambridge, and the Examinations of the University of London. Students are entitled to attend *any two* divisions for a single fee.

Fee, 20/- for three Terms; 15/- for two Terms; 10/- for one Term.

**LATIN.**

Professor, R. FANSHAWE, M.A.

Lecturer, F. BROOKS, M.A.

Monday, Wednesday, and Friday, 8—9.

The same arrangements will be observed as in the Greek Classes. The Elementary Class will be held on Wednesdays, the Middle Class on Fridays, and the Advanced Class on Mondays.

Fee, 20/- for three Terms; 15/- for two Terms; 10/- for one Term.

**HEBREW.**

Lecturer, BERNHARD HEYMANN.

A Reading Class will be held on Monday evenings from eight till nine during the first and second Terms.

Text-books may be obtained at the Secretary's Office.

Fee, for the Course, £2 2s.; for one Term, £1 1s.

**FRENCH LANGUAGE.**

Lecturer, EUGÈNE PÉLISSIER, M.A., LL.B., B.Sc.

ELEMENTARY CLASS FOR MEN.—Monday, 7—9.

*French Accidence*, E. Pellissier (Rivington).  
Chardenal's *Practical French Conversation*. Kastner's  
*Anecdotes Historiques et Littéraires* (Hachette).

ADVANCED CLASS FOR MEN.—Thursday, 7—9.

*French Syntax*, E. Pellissier (Rivington). *The graduated course of translation, Part I., Junior Course*, Cassal and Karcher. Edmond About, *Le Roi des Montagnes* (Hachette).

Lecturer, A. D'OURSY, B.A.

ELEMENTARY CLASS FOR WOMEN.—Friday, 7—9.

I.—Exercises in Chardenal's *Standard French Primer*. Practice in letter-writing.

- 2.—Translation in Chardenal's *French Reader*.
- 3.—Grammar. Accidence. Regular and most of the irregular verbs.
- 4.—Practice in French conversation.

ADVANCED CLASS FOR WOMEN.—Tuesday, 7—9.

1.—Translation from French into English of *Les Femmes Savantes*, by Molière; *Les Rayons et les Ombres*, by Victor Hugo.

2.—*French Composition*, by Kastner (Hachette's edition). Accidence and Syntax. Practice in letter-writing.

3.—Lectures on French Literature on the period set for the Cambridge Higher Local Examination. Students preparing for this Examination require the following text-books:—

*Dictionnaire Etymologique* (Brachet); *Histoire de la Littérature Française* (E. Geruzez); *Historical Grammar of the French Language* (Brachet).

Fee, 20/- for three Terms; 15/- for two Terms; 10/- for one Term.

## GERMAN LANGUAGE.

Lecturer, ADOLPH LEIPNER.

ELEMENTARY CLASS.—Wednesday and Friday, 7—8.

Otto's *Conversational German Grammar*.

Whitney's *German Reader* (Macmillan & Co.)

ADVANCED CLASS.—Wednesday and Friday, 8—9.

Eve's *German Grammar*; Lange's *German Composition* (Clarendon Press Series); *Selections from Modern Authors*.

Fee, 20/- for three Terms; 15/- for two Terms; 10/- for one Term.

## LECTURES AND CLASSES FOR ASSISTANT TEACHERS.

By the advice of some of the Head Teachers of Elementary Schools in Bristol, of Her Majesty's Inspector of Schools in Bristol, and others, and also by the special request and approval of the Bristol School Board, the following Lectures and Classes are arranged for Assistant Teachers who are preparing for their Certificate Examination. All the Classes are held at the College, and were started in January, 1889.

### TIME TABLE.

SUBJECT.	TAUGHT BY	Mon.	Tues.	Wed.	Thur.	Fri.	Sat.
Geometry & Algebra	Prof. D.C. Selman	—	7—8	—	—	—	—
Arithmetic & Mensuration ... ..	Mr. A. Smith ...	—	—	—	8—9	—	—
English Literature...	Mr. Morton Luce	—	—	—	—	8—9	—
English Grammar & Composition ...	Mr. H. Coward...	—	8—9	—	—	—	—
School Management	Mr. T. G. Wright	—	—	—	—	7—8	—
Geography & History	Mr. G. A. Evans	—	—	—	7—8	—	—
Domestic Economy.	Miss M. F. Arnott	—	7—8	—	—	—	—

Facilities will also be afforded for attending existing Classes in French, Latin, and German, on application to the Secretary of the College.

The Fee for the whole of the above course, or any part of it, will be 12/6 a Term, payable in advance.

The Classes recommence on the 1st October.

Assistant Teachers intending definitely to join are requested to send their names to the Secretary, at the University College, or Mr. T. G. Wright, Inspector of Board Schools, Bristol.



## GENERAL TIME TABLE OF EVENING CLASSES.

	Monday.	Tuesday.	Wednes- day.	Thursday.	Friday.
CHEMISTRY, Elementary .. (1, 2)	—	—	8	—	8
„ Advanced .. (1, 2)	—	—	7	—	—
„ applied to Soap and Candles .. .. } (1)	8	—	—	—	—
„ applied to Potting (2)	8	—	—	—	—
„ Photographic .. (1, 2)	—	—	—	—	7
MATHEMATICS.. .. . (a)	*7 to 9	—	*7 to 9	—	—
THEORETICAL MECHANICS .. ..	—	—	—	7	—
MECHANICAL ENGINEERING .. ..	—	—	—	8	—
ELECTRICITY AND MAGNETISM (1, 2)	8	—	—	—	—
Electrical Laboratory .. .. (1, 2)	—	—	—	*7 to 9	—
STEAM .. .. . (1, 2)	—	—	8	—	—
Workshop Instruction .. (1, 2) (b)	*7 to 9	—	—	*7 to 9	—
GEOMETRICAL AND MACHINE DRAWING .. .. . } (1, 2)	—	—	—	—	*7 to 9
ADVANCED GEOMETRY.. .. .	—	—	—	—	8
GEOLOGY .. .. . (1, 2)	—	7.30 to 9	—	—	—
ZOOLOGY .. .. . (1, 2)	7.30 to 9	—	—	—	—
BOTANY .. .. . (2, 3)	—	†7 to 9	—	—	—
ENGLISH LITERATURE .. (1, 2)	—	—	7.30	—	—
GREEK—					
Elementary .. .. .	—	—	*7	—	—
Middle .. .. .	—	—	—	—	*7
Advanced .. .. .	*7	—	—	—	—
LATIN—					
Elementary .. .. .	—	—	*8	—	—
Middle .. .. .	—	—	—	—	*8
Advanced .. .. .	*8	—	—	—	—
HEBREW .. .. . (1, 2)	*8	—	—	—	—
FRENCH—					
(Men) Elementary .. .. .	*7 to 9	—	—	—	—
„ Advanced .. .. .	—	—	—	*7 to 9	—
(Women) Elementary .. ..	—	—	—	—	*7 to 9
„ Advanced .. .. .	—	*7 to 9	—	—	—
GERMAN—					
Elementary .. .. .	—	—	*7	—	*7
Advanced .. .. .	—	—	*8	—	*8

The figures 1, 2, 3, indicate the Terms during which the courses are held. Where there is no figure they are held throughout the Session.

The instruction in the hours marked with \* will take the form of class teaching.

The instruction in the hours marked with † will in some part take the form of class teaching.

(a) Students in this class may attend either on Mondays or Wednesdays.

(b) Students may attend either on Mondays or Thursdays.

### UNIVERSITY COLLEGE DISTRICT LECTURES.

Short courses of lectures, or single lectures, for the people, will probably be delivered in the city during the Session.

### UNIVERSITY COLLEGE DISTRICT CLASSES.

In addition to the Evening Courses held at the College, classes in various subjects have been instituted in central or outlying parts of the city, and have been largely attended. These classes have been formed more especially for the benefit of those belonging to the wage-earning and industrial classes, and the admission fees have been fixed accordingly at low sums. They will be held during the Session at the British Schools, Redcross Street. Further information with regard to these classes may be obtained of the Secretary.

### LECTURES ON POLITICAL ECONOMY.

For three Sessions—1885-6, 6-7, 7-8—Free lectures on Political Economy have been delivered at the Athenæum Hall, in Bristol; and during the Session 1888-9 at the Merchant Venturers' School, and have been well attended by working men and others. To meet the cost of these lectures, Mr. F. Gilmore Barnett contributed a sum of £50 annually for four years.

**CLOTHWORKERS' COMPANY: CHEMICAL  
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The Professorship of Chemistry is at present partially endowed by an annual contribution from the Worshipful the Clothworkers' Company of London.

**ANCHOR SOCIETY: PROFESSORSHIP OF  
ENGINEERING.**

The Professorship of Engineering is occasionally assisted by contributions from the Anchor Society of Bristol.

**STUDENTS' ENDOWMENT FUND.**

A sum of more than £2000 has been collected by past and present students of the College towards the endowment of the chairs of English and Classical Literature.

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Llewellins and James ... ..	10	10	0
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Netham Chemical Company ... ..	10	10	0
Pass, Alfred C. ... ..	10	10	0
Phillips, Augustus ... ..	10	10	0
Proctor, C. W. Cope ... ..	10	10	0
Shipley, Alfred ... ..	10	10	0
Smith, William ... ..	10	10	0
Sommerville, W. ... ..	10	10	0
Thomas, Charles ... ..	10	10	0
Tothill, William ... ..	10	10	0
Tuckett, F. F. ... ..	10	10	0
Wait, W. K. ... ..	10	10	0
Wathen, Sir Charles, Mayor of Bristol ... ..	10	10	0
Weston, Sir Joseph D. ... ..	10	10	0
Wills, Edward P. ... ..	10	10	0
Wills, Frederick ... ..	10	10	0
Wills, H. O. ... ..	10	10	0
Wills, W. H. ... ..	10	10	0
Wilson, Rev. J. M. ... ..	10	10	0
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Colfox, William	5	0	0
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Wills, Samuel, and Co.	5	0	0
Grace, J. and H.	3	3	0
Ireland, J. Clayfield	3	3	0
Stephens, Gundry	3	3	0
Sturge, William	3	3	0
Addiscott, Henry	2	2	0
Ball, Miss	2	2	0
Bartholomew, F. M.	2	2	0
Bright, Miss	2	2	0
Champion, Robert	2	2	0
Charleton, Mrs. R.	2	2	0
Clark and Harrison	2	2	0
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Townsend, Frank ... ..	2	2	0
Wayte, Rev. S. W., B.D. ... ..	2	2	0
Whitwill, Mr. and Mrs. Mark ... ..	2	2	0
Wills, Charles, and Co. ... ..	2	2	0
Wills, Mrs. Frederick ... ..	2	2	0
Wills, George A. ... ..	2	2	0
Alcock, Captain ... ..	2	0	0
Barstow, H. C. ... ..	2	0	0
Cave, Mrs. ... ..	2	0	0
Fry, Lewis G. ... ..	2	0	0
Austin, E., and Son ... ..	1	1	0
Baker, Mrs. Proctor ... ..	1	1	0
Baker, Hiatt C. ... ..	1	1	0
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Brittan, Alfred ... ..	1	1	0
Brittan, Mrs. A. ... ..	1	1	0
Chappell, Samuel ... ..	1	1	0
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Cole, Mrs. T. Skelton ... ..	1	1	0
Daniel, Henry ... ..	1	1	0
Dunbar, Dr. Eliza W. ... ..	1	1	0
Dymond, Mrs. ... ..	1	1	0
Edwards, Arthur M. ... ..	1	1	0
Elliot, Miss ... ..	1	1	0
Fawn and Son, James ... ..	1	1	0
Fry, Albert M. ... ..	1	1	0
Fry, John D. ... ..	1	1	0
George, Mrs. Edward ... ..	1	1	0
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Stroud, Professor William	0	10	6
Townsend, H. H.	0	10	6
Wansey, Mrs.	0	10	6
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Wait, W. K.	...	...	...	...	...	100	0	0
Wills, Frederick	...	...	...	...	...	100	0	0
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Worsley, Philip J.	...	...	...	...	...	50	0	0
Brittan, Alfred	...	...	...	...	...	25	0	0
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Trapnell, Alfred	...	...	...	...	...	25	0	0
Taylor, Son & Hawkins	...	...	...	...	...	10	10	0
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Butlin, Charles	...	...	...	...	...	10	0	0
Charleton, Robert A.	...	...	...	...	...	10	0	0
Fox, Dr. E. L.	...	...	...	...	...	10	0	0
Fry, Alfred M.	...	...	...	...	...	10	0	0
Leonard, Miss L.	...	...	...	...	...	10	0	0
Moberly, W. O.	...	...	...	...	...	10	0	0
Worsley, Samuel	...	...	...	...	...	10	0	0
Worsley, Miss	...	...	...	...	...	10	0	0
Estlin, Miss	...	...	...	...	...	5	5	0
Prichard, Augustin	...	...	...	...	...	5	5	0
Badock, William F....	...	...	...	...	...	5	0	0
Brown, Rev. T. E.	...	...	...	...	...	5	0	0
Budgett, Mrs. John P.	...	...	...	...	...	5	0	0
Higgett, Dr. C.	...	...	...	...	...	5	0	0
Price, W. P.	...	...	...	...	...	5	0	0
Rintoul, D.	...	...	...	...	...	5	0	0
Sturge, Walter	...	...	...	...	...	5	0	0
Tuckett, Coldstream	...	...	...	...	...	5	0	0
Tuckett, Francis Fox	...	...	...	...	...	5	0	0
Wakefield, Mrs.	...	...	...	...	...	5	0	0
Williams, Dr. Eubulus	...	...	...	...	...	5	0	0
Price, Alfred N.	...	...	...	...	...	3	10	0
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Greenslade. E. A.	...	...	...	...	...	2	2	0

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Prideaux, Mrs. H... ..	2	0	0
Elliot, Miss ... ..	1	1	0
Frankis, Benjamin F. ... ..	1	1	0
Holmes, G. H. ... ..	1	1	0
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Thomas, Charles ... ..	100	0	0	„ five „
Stephens, Gundry ... ..	25	0	0	„ two „
Cross, F. R., M.B. ... ..	52	10	0	„ five „
Miles, Cave & Co. ... ..	52	10	0	„ five „
Percival, Rev. Dr. ... ..	52	10	0	„ five „
Trapnell, Caleb ... ..	52	10	0	„ five „
Moreton, Lord ... ..	31	10	0	„ three „
Weston, Sir Joseph D....	52	10	0	„ five „
Ducie, Earl of ... ..	30	0	0	„ three „
Robinson, Edward ... ..	50	0	0	„ five „
Reynolds, Colonel ... ..	50	0	0	„ five „
Thomas, Harry E. ... ..	50	0	0	„ five „
Watson, Rev. H. C. ... ..	20	0	0	„ two „
Baker, Arthur ... ..	26	5	0	„ five „
Morgan, Frederick ... ..	26	5	0	„ five „
Stuckey's Banking Company ...	26	5	0	„ five „
Davies, W. Howell ... ..	25	0	0	„ five „
Fry, Albert ... ..	25	0	0	„ five „
Gotch, Francis ... ..	25	0	0	„ five „
Jones, W. Arthur ... ..	25	0	0	„ five „
Sturge, Robert F. ... ..	25	0	0	„ five „
Swayne, Dr. J. G. ... ..	25	0	0	„ five „
Tryon, Stephen ... ..	21	0	0	„ five „
Gore, T. Holmes ... ..	10	10	0	„ five „
Protheroe, Thomas ... ..	5	0	0	„ five „

## MEDICAL SCHOOL WING FUND.

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### DONORS.

							£	s.	d.
Jones, S.	...	...	...	...	...	..	10	10	0
Lewis, William, and Son	...	...	...	...	...	...	10	10	0
Hansom, Chas. F.	...	...	...	...	...	...	10	0	0
Surrage, Miss Mary A.	...	...	...	...	...	...	10	0	0
Cannington, Miss Mary	...	...	...	...	...	...	5	5	0
Davies, John Evan	...	...	...	...	...	...	5	5	0
Walls, John	...	...	...	...	...	...	5	0	0
Graham, Colonel	...	...	...	...	...	...	1	1	0
Grey, Rev. J. T.	...	...	...	...	...	...	1	1	0

### ANNUAL SUBSCRIBERS.

Smith, Dr. R. Shingleton	...	...	10	0	0	(for five years)
Marshall, Dr. Henry	...	...	1	1	0	(for five years)

## University College, Bristol.

### List of Subscribers and Donors of Sums of £100 and upwards in one Year.

#### Year 1875.

	£	s.	d.
Addison, W. B. ... ..	100	0	0

#### Year 1876.

New College, Oxford (half-year) ... ..	150	0	0
Wills, George ... ..	100	0	0
Smith, Wm. ... ..	100	0	0
Wethered, Cossham, and Wethered ... ..	100	0	0
George, W. E. ... ..	250	0	0
Hawkshaw, Sir John ... ..	100	0	0
Lean, V. S. ... ..	500	0	0
Aberdare, Lord ... ..	100	0	0
Baker, Thos. ... ..	100	0	0
Tothill, William ... ..	100	0	0
Norris, Mrs. ... ..	200	0	0
Fry, J. Storrs ... ..	200	0	0
Barnett, F. G. ... ..	100	0	0
Dixon, Joseph ... ..	500	0	0
Leonard and Boulton ... ..	150	0	0
Harvey, J. and Sons ... ..	100	0	0
Stuckey's Banking Co. ... ..	100	0	0
Pranker, P. D. ... ..	500	0	0
Evans, Sparke ... ..	100	0	0
Hodgson, K. D., M.P. ... ..	500	0	0
Budgett, Samuel ... ..	100	0	0
Thomas, John ... ..	200	0	0
George, Alfred ... ..	500	0	0
Miles, J. W. ... ..	100	0	0
Sommerville, Wm. ... ..	500	0	0
Morley, Samuel, M.P. ... ..	500	0	0
Edwards, Geo. W. ... ..	100	0	0
Shipley, A. ... ..	100	0	0

## Year 1877.

						£	s.	d.
New College, Oxford	...	...	...	...	...	300	0	0
Clothworkers' Company	...	...	...	...	...	325	0	0
Bank of England, Bristol	...	...	...	...	...	100	0	0
Cave, C. D.	...	...	...	...	...	100	0	0
Miles, Cave and Co.	...	...	...	...	...	100	0	0
Dod, J. W.	...	...	...	...	...	100	0	0
Evans, D. Parker	...	...	...	...	...	100	0	0
Haycroft and Pethick	...	...	...	...	...	105	0	0
Powell, W. A. F.	...	...	...	...	...	100	0	0
Smith, Wm.	...	...	...	...	...	100	0	0
Wethered, Cossham, and Wethered	...	...	...	...	...	100	0	0
Derham, Samuel	...	...	...	...	...	100	0	0
Hill, Charles and Sons	...	...	...	...	...	125	0	0
Gibbs, Anthony	...	...	...	...	...	500	0	0
Miles, H. Cruger	...	...	...	...	...	100	0	0
Miles, Sir William	...	...	...	...	...	250	0	0
Budgett, W. H.	...	...	...	...	...	50	0	0
Osborne, Ward, Vassall and Co.	...	...	...	...	...	100	0	0
Palmer, H. A.	...	...	...	...	...	250	0	0
Fry, Lewis	...	...	...	...	...	500	0	0
Smyth, Bart., Sir Greville	...	...	...	...	...	100	0	0
Budgett, S.	...	...	...	...	...	100	0	0
Balliol College, Oxford	...	...	...	...	...	300	0	0

## Year 1878.

New College, Oxford	...	...	...	...	...	300	0	0
Clothworkers' Company	...	...	...	...	...	525	0	0
Smith, Wm.	...	...	...	...	...	100	0	0
Hill, Charles, and Sons	...	...	...	...	...	125	0	0
Balliol College, Oxford	...	...	...	...	...	300	0	0

## Year 1879.

New College, Oxford	...	...	...	...	...	300	0	0
Clothworkers' Company	...	...	...	...	...	525	0	0
Society of Merchant Venturers	...	...	...	...	...	333	6	8
Balliol College, Oxford	...	...	...	...	...	300	0	0
Lysaght, John	...	...	...	...	...	100	0	0
Smith, Wm.	...	...	...	...	...	100	0	0

## Year 1880.

New College, Oxford	...	...	...	...	...	300	0	0
Balliol College, Oxford	...	...	...	...	...	300	0	0
Society of Merchant Venturers	...	...	...	...	...	333	6	8
Medical School	...	...	...	...	...	500	0	0
Clothworkers' Company	...	...	...	...	...	525	0	0
Lysaght, John	...	...	...	...	...	100	0	0



## SUBSCRIBERS AND DONORS.

141

						£	s.	d.
Smith, Wm.	...	...	...	...	...	100	0	0
Fry, F. J.	...	...	...	...	...	100	0	0
Marshall, Prof. A.	...	...	...	...	...	100	0	0
Thomasson, J. P.	...	...	...	...	...	100	0	0
Winkworth, Mrs.	...	...	...	...	...	100	0	0

## Year 1881.

New College, Oxford	...	...	...	...	...	150	0	0
Balliol College, Oxford	...	...	...	...	...	300	0	0
Clothworkers' Company	...	...	...	...	...	300	0	0
Society of Merchant Venturers	...	...	...	...	...	333	6	8
Fry, J. Storrs	...	...	...	...	...	160	0	0
Garnett, Mrs.	...	...	...	...	...	100	0	0
Gibbs, Mrs. Anthony	...	...	...	...	...	100	0	0
Edwards, Geo. W.	...	...	...	...	...	100	0	0
Watson, Patrick	...	...	...	...	...	100	0	0

## Year 1882.

Clothworkers' Company	...	...	...	...	...	300	0	0
Anchor Society	...	...	...	...	...	300	0	0
J. L. E., per W. K. Wait	...	...	...	...	...	100	0	0
Robinson, John	...	...	...	...	...	100	0	0
George, Wm. E.	...	...	...	...	...	500	0	0
Shipley, A.	...	...	...	...	...	100	0	0
Wills, Fredk.	...	...	...	...	...	250	0	0
Miles, Cave, and Co.	...	...	...	...	...	100	0	0
Lean, V. S.	...	...	...	...	...	500	0	0
Morley, Samuel, M.P.	...	...	...	...	...	500	0	0
Cordeux, F.	...	...	...	...	...	100	0	0
Jowett, Prof. B.	...	...	...	...	...	100	0	0
Wait, W. K.	...	...	...	...	...	500	0	0

## Year 1883.

Clothworkers' Company	...	...	...	...	...	300	0	0
" "	...	...	...	...	...	1000	0	0
Anchor Society	...	...	...	...	...	300	0	0
Balliol College, Oxford	...	...	...	...	...	250	0	0
Medical School	...	...	...	...	...	200	0	0
Ramsay, Prof. W.	...	...	...	...	...	100	0	0
Jowett, Prof. B.	...	...	...	...	...	100	0	0
Wait, W. K.	...	...	...	...	...	500	0	0
Weston, J. D.	...	...	...	...	...	250	0	0

## Year 1884.

Clothworkers' Company	...	...	...	...	...	300	0	0
Anchor Society	...	...	...	...	...	300	0	0
Balliol College, Oxford	...	...	...	...	...	300	0	0
Industrial and Fine Arts' Exhibition	...	£1420	0	0				
Earl of Ducie, per ditto...	...	100	0	0	—	1520	0	0

## Year 1885.

					£	s.	d.
Clothworkers' Company	...	...	...	...	300	0	0
Anchor Society	...	...	...	...	200	0	0
Balliol College, Oxford	...	...	...	...	300	0	0

## Year 1886.

Clothworkers' Company	...	...	...	...	300	0	0
Balliol College, Oxford	...	...	...	...	300	0	0

## Year 1887.

Clothworkers' Company	...	...	...	...	100	0	0
Balliol College, Oxford	...	...	...	...	300	0	0

## Year 1888.

Clothworkers' Company	...	...	...	...	100	0	0
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*Subscriptions amounting in the aggregate to £100 or more.*

					£	s.	d.
Wilson, Rev. J. M.	...	...	...	...	50	0	0
"	"	(to Sustentation Fund)	...	...	84	0	0
Jolly and Son	...	...	...	...	50	0	0
"	"	(to Sustentation Fund)	...	...	80	0	0
Worsley, P. J.	...	...	...	...	50	0	0
"	"	(to Sustentation Fund)	...	...	73	10	0
Barnett, F. Gilmore (for Popular Lectures on Social Subjects)	...	...	...	...	50	0	0
							four years.

## LEGACIES.

						£	s.	d.
1885.	Stewart, John	...	...	...	...	1000	0	0
"	Harris, G. Cobb	...	...	...	...	100	0	0
1889.	Charleton, Robert Ash	...	...	...	...	200	0	0

## GIFTS.

The following Gifts have been received during the Session, 1888-89 :

## LIBRARY.

The Ladies' Committee of the Cambridge Local Examination, Bristol Centre, Girls—Books to the value of...	£40	0	0
Worsley, P. J. : Bookcases                   "       "       ...	25	0	0
Women's Debating Society : Books       "       "       ...	5	0	0

## Donations of Books from :

Backhouse, Katherine.  
Bureau of Education, Washington, U.S.A.  
Cambridge Philosophical Society.  
Carruthers, Rev. G. T.  
Civil Engineers, Institution of.  
Clarendon Press Warehouse, the Delegates.  
Dale, Dr. George  
Fox, Francis F., J.P.  
Fry, Francis J. Esq.  
Longmans, Messrs., and Co.  
Macmillan, Messrs., and Co.  
Marshall, Professor A.  
Mechanical Engineers, Institution of  
Murray, John, Esq.  
Society of Engineers.  
Stanley, H. F., Esq.  
*Textile Recorder.*  
*Textile World.*  
Virtue, Messrs. and Co., Lim.  
Wilson, Rev. J. M.

## Copies of Calendars from :—

Canterbury College, New Zealand.  
College of Preceptors.  
Dalhousie College and University, Halifax, N.S.  
Durham College of Medicine, Newcastle-on-Tyne.



	£	s.	d.
Budd, F. N....	1	1	0
Charleton, Robert A.	1	1	0
Davey, J.	1	1	0
Deedes, A.	1	1	0
Dobson, Nelson C.	1	1	0
Elliot, The Very Rev. G.	1	1	0
Fanshawe, Professor R.	1	1	0
George, Rev. H. B.	1	1	0
Hudd, A. E.	1	1	0
Leipner, Professor A.	1	1	0
Morgan, Professor C. Lloyd	1	1	0
Pass, A. C.	1	1	0
Percival, Rev. Dr.	1	1	0
Ramsay, Professor W.	1	1	0
Rowley, Professor J.	1	1	0
Ryan, Professor J.	1	1	0
Selman, Professor D. C.	1	1	0
Smith, Dr. R. Shingleton	1	1	0
Swann, E. J.	1	1	0
Tylor, E. B., D.C.L., F.R.S.	1	1	0
Wilson, Rev. J. M.	1	1	0
Young, Professor S.	1	1	0
Williams, Miss K. I. (Chemical dept.)	1	0	0

## Students' Subscriptions:—

Marsh, Miss E. May	0	2	6
Nunn, T. P.	0	2	6
O'Shee, J. P.	0	2	6
Smith, W.	0	2	6
Waters, Miss C. M....	0	2	6

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Various donations and subscriptions have also been received towards the maintenance of the Botanical Garden.





**UNIVERSITY OF OXFORD.**

Attention is directed to a Statute of the University of Oxford, recently passed, by which women who have passed the First Examination for Women, or any of the Examinations specified in the Regulations of the Oxford University Examinations for Women as equivalent thereto, may, without the obligation of residence, offer themselves for the Honour Examinations of the University in Greek and Latin, in Mathematics, in Modern History, or in Natural Science. Candidates who so offer themselves will be examined by the University Moderators or Public Examiners (as the case may be) in the same Papers and at the same time, and will be classed according to the same standard as members of the University, and may receive Certificates to that effect. Full particulars as to these Examinations will be found in *The Examination Statutes and Regulations* (Clarendon Press), copies of which (price 1/- each) can be obtained from the Secretary to the Delegacy of Local Examinations, Clarendon Building, Oxford, from whom information as to these and the other Examinations for Women of the University of Oxford can also be obtained.

## UNIVERSITY OF LONDON.

ABSTRACT OF THE REGULATIONS FOR DEGREES  
IN ARTS AND SCIENCE.

## MATRICULATION.

Second Monday in January and second Monday in June. Candidates must have completed their sixteenth year. Fee, £2.

SUBJECTS.—1. Latin; 2. *One* of the following languages: Greek, French, German, Sanskrit, Arabic; 3. The English Language, and English History, with the Geography relating thereto; 4. Mathematics; 5. Mechanics; 6. *One* of the following branches of Science: Chemistry, Heat and Light, Magnetism and Electricity, Botany.

The June Matriculation Examination is held in University College, Bristol. Local Fee, £1. For particulars with regard to the course arranged for students preparing for this Examination, see p. 103.

## INTERMEDIATE EXAMINATION IN ARTS.

Third Monday in July. Fee, £5.

SUBJECTS (PASS).—Classics: the Latin Language; History of Rome to the Death of Augustus; Greek. The English Language, Literature, and History. The French or the German Language. Mathematics.

## BACHELOR OF ARTS EXAMINATION.

Fourth Monday in October. Fee, £5.

SUBJECTS (PASS).—The following Branches of Knowledge; Branches I., II., and III. being compulsory, but an option being allowed between Branch

IV. and Branch V.: I. Latin, with Roman History; II. Greek, with Grecian History; III. *One* of the following Languages: English, French, German, Italian, Arabic, Sanskrit; IV. Either *Pure* or *Mixed* Mathematics; V. Mental and Moral Science.

#### MASTER OF ARTS EXAMINATION.

First Monday in June. Fee, £10.

SUBJECTS.—One or more of the following Branches of Knowledge: I. Classics; II. Mathematics and Natural Philosophy; III. Mental and Moral Science, Political Philosophy, History of Philosophy, Political Economy; IV. Any two of the following subjects: 1. English Language and Literature, including Anglo-Saxon Language and literature; 2. French Language and Literature; 3. German Language and Literature; 4. Italian Language and Literature; 5. The Celtic Languages and Literature; 6. Hebrew Language and Literature, with Syriac Language and Literature; 7. Sanskrit Language and Literature; 8. Arabic Language and Literature.

#### DOCTOR OF LITERATURE EXAMINATION.

First Tuesday in December. Fee, £10.

Candidates for the Degree of Doctor of Literature shall be required to have passed the M.A. Examination in Branch I., and also in either Branch III. or Branch IV.

Every candidate for this Examination shall be required to transmit, not later than October 1st, an original printed Essay or Thesis upon some special subject within the purview of Branch I. or III., or IV. of the M.A. Examination, embodying the result of independent research, or a critical review of what has been written on the subject.

## INTERMEDIATE EXAMINATION IN SCIENCE.

Third Monday in July. Fee, £5.

SUBJECTS (Pass).—Inorganic Chemistry; Experimental Physics; Mathematics; General Biology.

## BACHELOR OF SCIENCE EXAMINATION.

Third Monday in October. Fee, £5.

SUBJECTS (Pass).—*Any three* of the nine following subjects: I. Pure Mathematics; II. Mixed Mathematics; III. Experimental Physics; IV. Chemistry; V. Botany; VI. Zoology; VII. Animal Physiology; VIII. Physical Geography and Geology; IX. Mental and Moral Science.

## DOCTOR OF SCIENCE EXAMINATION.

Within the first twenty-one days of June. Fee, £10.

Every Candidate for the Degree of D.Sc. shall forward a statement in writing of the special subject within the purview of the Faculty of Science, as set out in the Programme of the B.Sc. Examination, upon a knowledge of which he rests his qualification for the Doctorate; and with this statement he shall transmit an original printed Dissertation or Thesis, treating scientifically some special department of the subject so named, embodying the result of independent research, or showing evidence of his own work, whether based on the discovery of new facts observed by himself, or of new relations of facts observed by others, or generally, tending to the advancement of Science.

## PRELIMINARY SCIENTIFIC (M.B.) EXAMINATION.

Third Monday in July and third Monday in January.  
Fee, £5.

SUBJECTS (Pass).—Chemistry and Physics ;  
General Biology.

For particulars with regard to the course arranged for students preparing for this Examination, see p. 102.

*For further information with regard to these Examinations, the Examinations for Honours, and the various Prizes and Exhibitions offered for competition, see the Calendar of the University of London.*

## WHITWORTH SCHOLARSHIPS AND EXHIBITIONS.

## ABSTRACT FROM THE REGULATIONS.

The Whitworth Scholarships are of the value of £125 a year, and tenable for three years. The Exhibitions are of the value of £100 and £50, tenable for one year. They are open for competition to any of Her Majesty's subjects under twenty-six years of age on the 1st May. Candidates must have been engaged in handicraft for at least three years, and have been at work at the vice and lathe, or the forge, or the bench, for at least six consecutive months in each of those years. They must have spent at least twelve months at the vice and lathe.

About twenty-five £50 Exhibitions, tenable for one year, and four Scholarships of £125 a year, tenable for three years, will be competed for in May, 1890; and about twenty-five £50 Exhibitions, and four Scholarships of £125 a year, and tenable for three years, in each subsequent year.

The Competition will be in the following subjects:

Practical geometry.	Sound, light, and heat.
Machine drawing.	Magnetism and electricity.
Building construction.	Inorganic chemistry.
Naval architecture.	Metallurgy.
Mathematics.	Steam.
Theoretical mechanics.	Freehand drawing.
Applied mechanics.	

The maximum number of marks obtainable in each subject except Mathematics will be, in the

Elementary stage	-	-	100
Advanced stage	-	-	200
Honours	-	-	400

No candidate can obtain an Exhibition or Scholarship who has not passed in the advanced stage, or "honours," of practical geometry; and the second or a higher stage, or the "honours" of those stages, of mathematics; and obtained a first class of the elementary stage, or in either class of the advanced or "honours" of theoretical mechanics; and obtained a "good" in freehand drawing.

No candidate can obtain an Exhibition or Scholarship who has not attained a sufficient handicraft power. And if thought necessary by the Department this may be tested by requiring him to make two Whitworth screw bolts, 1 in. in diameter and 4 to 6 in. long, with hexagonal heads and nuts, alike within '001 in.

Candidates must apply to the Science and Art Department *before the 14th April*. Write for Science Forms, Nos. 90 and 330.

Further particulars may be obtained from the Whitworth Prospectus, price 3d., for which apply to



the Secretary, Science and Art Department, South Kensington, London, S.W.

*Students of University College, Bristol, intending to compete for Whitworth Scholarships, should send their forms to the Secretary, not later than Saturday, 5th April.*

## THE INSTITUTE OF CHEMISTRY.

### ABSTRACT OF THE REGULATIONS FOR ADMISSION TO THE ASSOCIATESHIP.

Every candidate for the Associateship will be required to produce evidence of the following qualifications:—

- (1.) That he is not less than twenty-one years of age.
- (2.) That he has passed satisfactorily through a course of three years' study in any one or more of the Universities or chartered or incorporated Colleges or Schools previously approved by the Council, in the subjects of Theoretical and Analytical Chemistry, Physics and Elementary Mathematics.
- (3.) That he has passed such Examinations in these subjects at such Universities, Colleges and Schools as the Council may from time to time direct.

When, however, a candidate for the Associateship cannot adduce evidence of having passed an examination in Theoretical and General Chemistry, Physics, and Mathematics, satisfactory to the Council, he may be required to pass an examination; such examination to be by printed or written questions, to which the candidate shall return written answers, without access to books, MSS. or memoranda.

## EXCEPTIONS.

If a candidate has passed any of the following examinations, it will be considered as sufficient evidence of training in General and Theoretical Chemistry, Physics, and Elementary Mathematics, and he shall not be required to pass any further examination in these subjects:—

- (1.) The final Honours Examination for the degree of B.A. at the University of Oxford in the subject of Chemistry, in the School of Natural Science.
- (2.) The final or degree Examination for B.Sc. in the Universities of Edinburgh, Durham, or London, or the Victoria University, in the subjects of Chemistry and Physics.
- (3.) The Senior Moderatorship in Experimental Science in the University of Dublin.
- (4.) The Associateship of the Royal School of Mines, if taken before 1884.
- (5.) The Associateship of the Normal School of Science in the division of Chemistry.
- (6.) The Associateship of the Royal College of Science, Dublin, in the Faculty of Manufactures.

## PRACTICAL EXAMINATION.

Every candidate for the Associateship will be required to pass a Practical Examination in Analytical Chemistry as follows :

Qualitative Analysis	-	Two days.
Quantitative Analysis	-	Two days.

With a brief *vivâ voce* Examination on the morning of the fifth day, when considered needful by the Examiner.

The Fee for this Examination is Two Guineas. In the event of the candidate failing to pass, the Fee will not be returned to him, but he will be admitted to one subsequent examination on payment of One Guinea.

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University College, Bristol, has been approved by the Council of the Institute as a College at which all the subjects required for the admission of Associates to the Institute are taught, and as a centre for the Practical Examination.

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Copies of the Regulations of the Oxford and Cambridge Local Examinations, the Examinations of the University of London, the Examinations of the College of Preceptors, and the L.L.A. Examination for Women of the University of St. Andrew's, may be obtained on application to the Secretary. The Regulations for the Examinations of the Science and Art Department and for Whitworth Scholarships are kept in the office for reference.



SESSION 1889—90.



APPENDIX.

## APPENDIX.

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### LIST OF SCHOLARS.

*(Recommended by the Educational Board.)*

SESSION 1889—90.

*Chemical Scholarship—*

George L. Thomas.

*Engineering Scholarship—*

Alfred N. Nathan.

*John Stewart Scholarships—*

1. Horace B. Wilson.
2. Ernest W. Groves.

*Gilchrist Scholarships—*

Thomas P. Nunn.  
William R. Jamieson.

*Hugh Conway Scholarship—*

Sophie Stephenson-Jellie.  
E. May Marsh (by special recommendation).

*Catherine Winkworth Scholarships—*

1. Alberta A. Linthorn.
2. No recommendation.

*Evening Scholarships—*

1. Annie M. Powell.
2. John Parnall.



## Engineering Society.

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### OFFICERS, 1888-9.

President—Professor RYAN, M.A., D.Sc., LL.M.

Hon. Vice-Presidents—{ Professor SELMAN, M.I.M.E.  
A. J. WARD.

Vice-President—R. A. BRUCE.

Secretary and Treasurer—C. P. BANHAM.

Librarian—J. G. AMES.

Committee—{ P. Y. ALEXANDER,  
G. S. DARBY,  
H. W. MOLESWORTH.

The Inaugural Address was given by the President, on “The Relative Values of Theory and Practice in Engineering.” In addition, the following Papers have been contributed by members:—

The Pattern-maker ... ..	G. S. DARBY.
Hydraulic Machinery ... ..	J. G. AMES.
Arches ... ..	Professor RYAN.
The Testing of Structures and Testing Machines ... ..	} Professor SELMAN.
Foundry Work ... ..	
Turning ... ..	R. A. BRUCE.
	C. P. BANHAM.

Excursions have been made to Messrs. Thomas's Soap Works; Messrs. Pope's Engineering Works; the Collieries of Countess of Waldegrave and Braysdown Colliery, Radstock; Bristol Wagon Works; Messrs. Robinson's Paper-bag and Printing Works, and the South Liberty Colliery.

The Session terminated with a *Conversazione* on April 4th, the chair being taken by Professor Lloyd Morgan, Dean of the College.

# Examinations of Day and Evening Classes.

SESSION 1888-89.

## EXAMINATIONS OF DAY CLASSES.

CLASS I.

### CHEMISTRY.

JUNIOR.

*First Term* :—

Lionel H. Barnard,  
Henry W. Hartnell.

Hugh W. Molesworth,  
Harold S. Thompson,  
Colin M. Wilson.

*Second Term* :—

Henry W. Hartnell.

Lionel H. Barnard,  
Charles C. Smyth.

SENIOR.

*First Term* :—

Thomas P. Nunn,  
John M. Boucher.

Frederic H. V. Mather,  
Wykeham T. Lydall,  
Charles F. Steele,  
William Smith.

*Second Term* :—

William Smith,  
Wykeham T. Lydall,  
Charles F. Steele.

### MATHEMATICS.

ELEMENTARY.

*First Term* :—

Charlotte M. Waters,  
Charles C. Smyth,  
Alexander G. Bond,  
Charles F. Granger,  
Hugh W. Molesworth, }  
Thomas Davies, }  
Henry W. Hartnell }  
Arthur A. Jenkins, }  
Harold S. Thompson.

Lionel H. Barnard,  
John P. O'Shee,  
Cecil E. Shipley,  
James E. L. Homer, }  
Albert Woodward. }

## CLASS I.

## CLASS II.

*Second Term:—*

## PART I.

Alfred E. Burnett,  
Edward H. Phillips,  
Charles A. Phillips, }  
Albert Woodward, }  
Cecil E. Shipley. }

Bernard W. Graham.

## PART II.

Charlotte M. Waters,  
Thomas Davies,  
Henry W. Hartnell,  
Hugh W. Molesworth, }  
Alexander G. Bond }

Arthur A. Jenkins,  
Charles C. Smyth,  
Charles F. Granger.

*Third Term:—*

## PART I.

Edward H. Phillips,  
Cecil E. Shipley,  
Albert E. Burnett,  
Charles A. Phillips.

Albert Woodward,  
Gabriel de'A. Botelho.

## PART II.

Charlotte M. Waters,  
Henry W. Hartnell, }  
Hugh W. Molesworth, }  
Thomas Davies,  
Charles F. Granger.

Alan P. Gardiner,  
John P. O'Shee,  
Lionel H. Barnard.

## INTERMEDIATE.

*First Term:—*

Thomas P. Nunn,  
Alberta A. Linthorn.

William G. Moore, }  
Alfred N. Nathan, }  
Perceval B. Clarke,  
George S. Darby,  
John G. Ames.

*Second Term:—*

Alfred N. Nathan,  
Perceval B. Clarke.

Benjamin E. Horlick,  
Edgar S. Jones, }  
John G. Ames. }

*Third Term:—*

Thomas P. Nunn.

Benjamin E. Horlick,  
Alfred N. Nathan,  
Edgar S. Jones.

## ADVANCED.

*First Term:—*

Robert A. Bruce,  
C. Procter Banham.

## CLASS I.

*Second Term :—*

Robert A. Bruce.

C. Procter Banham.

*Third Term :—*

C. Procter Banham.

## MIXED.

*First Term :—*Robert A. Bruce,  
C. Procter Banham.

## SPECIAL.

*Second Term :—*Thomas P. Nunn,  
Alberta A. Linthorn.

## EXPERIMENTAL PHYSICS.

## FIRST YEAR COURSE.

*First Term :—*Charlotte M. Waters,  
Henry W. Hartnell,  
Charles C. Smyth.Lewis T. Harry,  
Lionel H. Barnard,  
Arthur A. Jenkins.*Second Term :—*Charlotte M. Waters,  
Henry W. Hartnell,  
Charles C. Smyth,  
Lionel H. Barnard.Arthur A. Jenkins,  
Hugh W. Molesworth,  
Edgar S. Jones,  
Charles F. Granger,  
George Ligertwood,  
John P. O'Shee,  
Gomer R. Hern.*Third Term :—*Charlotte M. Waters,  
Henry W. Hartnell.

Lionel H. Barnard.

## SECOND YEAR COURSE.

*First Term :—*Thomas P. Nunn,  
William Smith,  
Charles F. Steele,  
Alfred N. Nathan,  
Alberta A. Linthorn,  
Wykeham T. Lydall.Frederic H. V. Mather,  
John G. Ames,  
Perceval B. Clarke,  
George S. Darby.

## CLASS I.

*Second Term:—*

William Smith,  
 Alfred N. Nathan,  
 Alberta A. Linthorn,  
 Charles F. Steele,  
 Wykeham T. Lydall.

## CLASS II.

Frederic H. V. Mather,  
 Harold Jacques,  
 Perceval B. Clarke.

*Third Term:—*

Thomas P. Nunn,  
 Alfred N. Nathan.

Wykeham T. Lydall,  
 William Smith,  
 Alberta A. Linthorn.

## ELECTRO TECHNICS.

*Third Term:—*

Alfred N. Nathan,  
 C. Procter Banham, }  
 Cecil Gibbins. }

John G. Ames.

## ENGINEERING.

## FIRST YEAR COURSE.

*Second Term:—*

Henry W. Hartnell,  
 Arthur A. Jenkins, }  
 Charles C. Smyth, }  
 Hugh W. Molesworth,  
 Lionel H. Barnard,  
 John P. O'Shee.

Charles F. Granger,  
 Bernard W. Graham,  
 Edgar S. Jones.

*Third Term:—*

Bernard W. Graham,  
 Hugh W. Molesworth,  
 John P. O'Shee.

Edgar S. Jones,  
 George Ligertwood,  
 Gabriel d'A. Botelho,  
 Belisario d'A. Fonseca.

## SECOND YEAR COURSE.

*First Term:—*

Alfred N. Nathan,  
 George S. Darby,  
 Perceval B. Clarke,  
 John G. Ames.

*Second Term:—*

Alfred N. Nathan,  
 John G. Ames.

Perceval B. Clarke,  
 George S. Darby,  
 Charles W. Stear.

## THIRD YEAR COURSE.

*First Term:—*

Robert A. Bruce,  
 C. Procter Banham.

## CLASS I.

## CLASS II.

*Second Term :—*

Robert A. Bruce,  
C. Procter Banham.

## SURVEYING.

*Third Term :—*

Hugh W. Molesworth,  
John P. O'Shee,  
Gabriel d'A. Fonseca,  
Charles W. Stear.

Bernard W. Graham,  
Belisario d'A. Fonseca.

## MACHINE DESIGN AND DRAWING.

## FIRST YEAR COURSE.

*First Term :—*

Hugh W. Molesworth,  
Henry W. Hartnell,  
George Ligertwood, }  
Arthur A. Jenkins. }

Charles C. Smyth,  
Lionel H. Barnard, }  
James E. L. Homer, }  
John P. O'Shee.

*Second Term :—*

Hugh W. Molesworth,  
Henry W. Hartnell, }  
Charles C. Smyth, }  
George Ligertwood, }  
Arthur A. Jenkins,  
Edgar S. Jones,  
Lionel H. Barnard,  
James E. L. Homer,  
John P. O'Shee.

Belisario d'A. Fonseca,  
Bernard W. Graham.

## SECOND YEAR COURSE.

*First Term :—*

George S. Darby,  
William G. Moore,  
John G. Ames, }  
Alfred N. Nathan. }

Perceval B. Clarke.

*Second Term :—*

Alfred N. Nathan,  
John G. Ames

William G. Moore,  
Perceval B. Clarke.

## THIRD YEAR COURSE.

*First Term :—*

Robert A. Bruce,  
C. Procter Banham.

*Second Term :—*

C. Procter Banham, }  
Robert A. Bruce. }

## CLASS I.

## CLASS II.

## GEOMETRICAL DRAWING.

## FIRST YEAR COURSE.

*First Term :—*

Henry W. Hartnell,  
 Hugh W. Molesworth,  
 Charles C. Smyth,  
 John P. O'Shee,  
 Arthur A. Jenkins,  
 Charles F. Granger.,

George Ligertwood,  
 Lionel H. Barnard,  
 James E. L. Homer.

*Second Term :—*

Henry W. Hartnell,  
 Hugh W. Molesworth, }  
 Charles C. Smyth, }  
 Arthur A. Jenkins,  
 Charles F. Granger.

Lionel H. Barnard,  
 Edgar S. Jones,  
 James E. L. Homer,  
 George Ligertwood,  
 Belisario d'A. Fonseca.

## SECOND YEAR COURSE.

*First Term :—*

William G. Moore, }  
 Alfred N. Nathan, }  
 George S. Darby.

John G. Ames,  
 Perceval B. Clarke.

*Second Term :—*

Alfred N. Nathan,  
 William G. Moore.

George S. Darby,  
 Perceval B. Clarke, }  
 John G. Ames. }

## APPLIED GEOLOGY.

*Second Term :—*

William G. Moore.

Edgar S. Jones.

## SPECIAL ZOOLOGY.

*First Term :—*

Thomas P. Nunn,  
 Charles F. Steele,  
 Wykeham T. Lydall.

William Smith.

*Second Term :—*

Wykeham T. Lydall,  
 William Smith.

Frederic H. V. Mather,  
 Alberta A. Linthorn,  
 Charles F. Steele,  
 Arthur D. Griffiths:

*Third Term :—*

Thomas P. Nunn,  
 Arthur D. Griffiths, }  
 Charles F. Steele, }  
 William Smith, }  
 Wykeham T. Lydall.

Frederic H. V. Mather,  
 Albert E. Burnett.



## CLASS I.

## CLASS II.

## BOTANY.

*First Term :—*

Thomas P. Nunn,  
William Smith.

*Second Term :—*

William Smith.

Charles F. Steele,  
Wykeham T. Lydall.

*Third Term :—*

Horace B. Wilson,  
Ernest W. Groves.

Thomas P. Nunn,  
William Smith.

## MODERN HISTORY.

*First Term :—*

Lila M. Price,  
Isabella M. B. Colthurst,  
Suason E. Dunsford.

Rosalie H. R. Powell.

## ENGLISH HISTORY.

*Second Term :—*

Suason E. Dunsford,  
Anna T. Fry,  
Eleanor M. Storr.

Caroline Storr,  
Isabella M. B. Colthurst.

*Third Term :—*

Eleanor M. Storr,  
Suason E. Dunsford,  
Caroline Storr,  
Lila M. Price.

Mary Peart,  
Isabella M. B. Colthurst.

## ENGLISH HISTORY (for Matriculation).

*First Term :—*

Charlotte M. Waters,  
Edward H. Marsh.

Colin M. Wilson.

*Second Term :—*

Charlotte M. Waters,  
Edward H. Marsh.

Edward H. Phillips,  
Colin M. Wilson.

## ENGLISH LITERATURE.

*First Term :—*

Katharine D. Ewart,  
Mabel S. K. Wait,  
Amy C. I. Cay,  
Sophie Stephenson-Jellie,  
Norah L. Fry,  
Mary L. Warren,  
Octavia Townsend,  
Margaret I. Mather.

## CLASS I.

## CLASS II.

*Second Term :—*

Katharine D. Ewart,  
 Norah L. Fry,  
 Sophie Stephenson-Jellie,  
 Amy C. I. Cay,  
 Adeline W. Fox.

Margaret I. Mather,  
 Ida G. Reynolds.

*Third Term :—*

Mabel S. K. Wait,  
 Ida G. Reynolds,  
 Mary Peart.

## GREEK.

## ELEMENTARY (I.)

*First Term :—*

Cecil E. Shipley.

*Second Term :—*

Cecil E. Shipley.

*Third Term :—*

Cecil E. Shipley.

## ELEMENTARY (II.)

*First Term :—*

Thomas Davies,  
 Albert Woodward.

*Second Term :—*

Thomas Davies.

Albert Woodward.

*Third Term :—*

Thomas Davies.

Albert Woodward.

## MIDDLE.

*Second Term :—*

Lewis T. Harry, }  
 Gomer R. Hern. }

*Third Term :—*

Gomer R. Hern.

Norman Pritchett,  
 Lewis T. Harry.

## ADVANCED.

*First Term :—*

Benjamin Oriel.

*Second Term :—*

Alexander G. Bond.

## CLASS I.

## CLASS II.

## LATIN.

## ELEMENTARY (I.)

*First Term:*

Thomas Davies,  
Charlotte M. Waters,  
Albert Woodward.

Cecil E. Shipley.

*Second Term:—*

Thomas Davies,  
Charlotte M. Waters,  
Albert Woodward.

Cecil E. Shipley.

*Third Term:—*

Thomas Davies,  
Charlotte M. Waters,  
Ida G. Reynolds.

Cecil E. Shipley,  
Albert Woodward.

## ELEMENTARY (II.)

*Second Term:—*

Edward H. Phillips.

*Third Term:—*

Edward H. Phillips.

## MIDDLE.

*First Term:—*

Edward H. Marsh,  
Colin M. Wilson.

*Second Term:—*

Edward H. Marsh,  
Colin M. Wilson.

## ADVANCED.

*First Term:—*

Alexander G. Bond,  
Benjamin Oriel.

*Second Term:—*

Enid Stacey.

Benjamin Oriel.

*Third Term:—*

Benjamin Oriel.

## FRENCH.

## ELEMENTARY.

*First Term:—*

Edward H. Marsh,  
Colin M. Wilson.

Frances E. Blood.

CLASS I.

Edward H. Marsh,  
Colin M. Wilson.

*Second Term :—*

ADVANCED.

*First Term :—*

Charles Paul.

*Second Term :—*

Sophie Stephenson-Jellie,  
Charles Paul.

*Third Term :—*

Charles Paul.

GERMAN.

ELEMENTARY.

*Second Term :—*

Isabella M. B. Colthurst.

FIRST DIVISION.

*Third Term :—*

Isabella M. B. Colthurst.

ADVANCED.

*Second Term :—*

Charles Paul.

FIRST DIVISION.

*Third Term :—*

Charles Paul.

SECOND DIVISION.

*Third Term :—*

Kate Alen.

Janet E. Wilson.

## EXAMINATIONS OF EVENING CLASSES.

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CLASS I.

CLASS II.

### CHEMISTRY.

JUNIOR.

*First Term* :—

Kate M. Wood.

William J. Finch,  
Herbert K. Isaac.

*Second Term* :—

Kate M. Wood.

William J. Finch,  
Herbert K. Isaac,  
John P. Jenkins.

### MATHEMATICS.

ELEMENTARY.

*Second Term* :—

Francis J. Griffith,  
Charles F. Smith,  
William J. B. Davis,  
Llywelyn Hughes.

Frederic J. Eastmead, }  
Blanche E. Walters, }  
Victor A. Shaw,  
Annie E. Eyles,  
Arthur Daws, }  
George Garrard. }

*Third Term* :—

Annie Powell,  
Charles F. Smith.

George Garrard.

ADVANCED.

*Second Term* .—

Alfred J. Ward.

*Third Term* .—

Edith Reynolds.

## CLASS I.

## CLASS II.

## ELECTRICITY AND MAGNETISM.

*First Term :—*

Alfred N. Nathan,  
 William J. B. Davis,  
 Arthur Daws,  
 Llywelyn Hughes.

Victor A. Shaw,  
 Frederic J. Eastmead,  
 John H. Hooper.

*Second Term :—*

Alfred N. Nathan, }  
 Alfred Salanson. }

## STEAM.

*First Term :—*

Arthur Daws,  
 Walter Dymond,  
 Victor A. Shaw.

*Second Term :—*

William J. B. Davis.

Frederic J. Eastmead,  
 Victor A. Shaw,  
 Walter Dymond,  
 Arthur Daws, }  
 John H. Hooper, }  
 Llywelyn Hughes.

## MACHINE DESIGN AND DRAWING.

*Second Term :—*

Arthur Daws,  
 John H. Hooper, }  
 Victor A. Shaw. }

Leonard Peckett,  
 Frank G. Fowler, }  
 James K. Robertson. }

## GEOMETRICAL DRAWING.

*Second Term :—*

Victor A. Shaw.

## BOTANY.

*Second Term :—*

Alice H. Boyle,  
 Mrs. Alice M. Boyle,  
 Frederick Ellis.

*Third Term :—*

Alice H. Boyle,  
 Alice K. Farmer.

## CLASS I.

## CLASS II.

## GREEK.

## MIDDLE.

*Third Term* :—

William Barkla., Senr.

## FRENCH.

## MEN.

## ELEMENTARY.

*First Term* :—

Willie S. Skinner.

## ADVANCED.

*Second Term* :—

Henry E. R. Evans.

*Third Term* :—

Frank Pleasance.

## FRENCH.

## WOMEN.

## ELEMENTARY.

*First Term* :—

Edith S. Desprez.

Helen A. Smith,  
 Louisa Prince,  
 Rosalie H. R. Powell,  
 Amy Philpott,  
 Helen S. Anderson, }  
 Kate Price. }

*Second Term* :—

Edith S. Desprez,  
 Annie Stiles.

*Third Term* :—

Margaret Dadley.

Lily Hill,  
 Helen A. Smith,  
 Annie Stiles.

## ADVANCED.

*First Term* :—

Maud E. Hewett.

*Second Term* :—

Florence E. Skeates,  
 Maud E. Hewett.



## CLASS I.

*Third Term :—*

Florence E. Skeates,  
Maud E. Hewett.

## CLASS II.

## GERMAN.

## ELEMENTARY.

*Second Term :—*

Edith J. Sowter,  
Blanche E. Walters,

*Third Term :—*

Blanche E. Walters,  
Mary Turner.

## ADVANCED.

*Second Term :—*

Emily S. Blinkhorn.

## FIRST DIVISION.

*Third Term :—*

Amelia M. Richards.

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## STUDENTS OF THE COLLEGE.

SESSION 1888—89.

### DAY.

Alexander, Patrick Y.  
Ames, John G.  
Anwyl, Reginald A.  
Baker, Ernest A.  
Balfour, Andrew  
Banham, C. Procter  
Barber, George A. W.  
Barnard, Lionel H.  
Bond, Alexander G.  
Botelho, Gabriel de A.  
Boucher, John M.  
Bruce, Robert A.  
Burnett, Albert E.  
Clarke, Perceval B.  
Collins, Frederick R.  
Cowcill, John R.  
Cripps, Percy R.  
Darby, George S.  
Davies, George T.  
Davies, Thomas  
Davies, Thomas R.  
Dumas, Rev. James.  
Fawcett, Fritz B.  
Finch, William J.  
Fisher, William F. D.  
Fonseca, Belisario d'A.  
Gage-Parsons, Dr. James St. J.  
Gardiner, Allan P.  
Gibbins, Cecil  
Graham, Bernard W.  
Granger, Charles F.  
Griffiths, Arthur D.  
Grindon, Charles E.  
Groves, Ernest W.  
Harry, Lewis T.  
Hartnell, Henry W.  
Heath, Arthur J.  
Hern, Gomer R.  
Holmes a'Court, Richard H.  
Homer, James E. L.  
Horlick, Benjamin E.

Hudden, William E. C.  
Hume, Seignelay G. W.  
Hyatt, James T.  
Jacques, Harold  
Jenkins, Arthur A.  
Jones, Edgar S.  
Jones, William D.  
Ligertwood, George  
Lydall, Wykeham T.  
Maclean, H. D. N.  
Macpherson, W. D. L.  
Marsh, Edward H.  
Mather, Frederic H. V.  
Molesworth, Hugh W.  
Moore, William G.  
Morgan, Edgar J.  
Morgans, Thomas  
Nathan, Alfred N.  
Neighbour, John  
Nunn, Thomas P.  
Oriel, Benjamin  
O'Shee, John P.  
Parsons, John H.  
Paul, Charles  
Phillips, Charles A.  
Phillips, Edward H.  
Press, Frederick J.  
Price, George B.  
Pritchett, Norman  
Redfern, George S.  
Salvatori, José  
Saunders, Rev. Morley B.  
Shipley, Cecil E.  
Smith, William  
Smyth, Charles C.  
Smyth, Joshua C.  
Stead, Charles C.  
Stear, Charles W.  
Steele, Charles F.  
Tanner, William E.  
Taylor, Stephenson

Thomas, Herbert R.  
Thompson, Harold S.  
Tripp, Henry H.

Wilson, Colin M.  
Wilson, Horace B.  
Woodward, Albert

Allen, Kate  
Alleyne, Annabella  
Baker, Edith M.  
Baker, Florence M.  
Baker, Kate E.  
Baker, Mrs. Mills  
Bird, Daisy  
Blood, Frances E.  
Bower, E. A.  
Bowley, Mary  
Bowman, Amy G.  
Browning, Emily C.  
Budgett, Florence A.  
Budgett, Mrs. W. H.  
Cay, Amy C. I.  
Clarke, Marian  
Coles, Letitia L.  
Colthurst, Isabella M. B.  
D'Oursy, Pauline  
Dunsford, Suason E.  
Evans, Mrs. M. B.  
Ewart, Katharine D.  
Fox, Adeline W.  
Fox, Sarah A.  
Fry, Anna T.  
Fry, Mrs. F. J.  
Fry, Mariabella  
Fry, Millicent M.  
Fry, Norah L.  
Gedye, Edith J.  
Hartnell, Theodosia L.  
Hickman, Edith  
Linthorn, Alberta A.  
Mardon, Christine L.  
Mather, Margaret I.  
Mayor, Elizabeth

Pass, Mrs. Lilla  
Peart, Mary  
Pease, Caroline S.  
Pease, Marian F.  
Pease, Mrs. Ormston  
Peck, Alice M.  
Powell, Rosalie H. R.  
Price, Lila M.  
Reynolds, Ada G.  
Roscoe, Elizabeth M.  
Stacy, Enid  
Stephenson-Jellie, Sophie  
Storr, Caroline  
Storr, Eleanor M.  
Sturge, Isabel  
Sturge, Lucy  
Tanner, Agnes E.  
Tanner, Edith M.  
Tanner, Margaret R.  
Townsend, Octavia  
Trapnell, Mrs. A.  
Tribe, Mrs. W. N.  
Tryon, Mrs. S.  
Turner, Mrs. Anne  
Wait, Anna B.  
Wait, Mabel S. K.  
Warren, Beatrice L.  
Warren, Mary L.  
Waters, Charlotte M.  
Williams, Elizabeth A.  
Williams, Katherine I.  
Wills, Lillie  
Wilson, Janet E.  
Wood, Kate M.  
Wylie, Dora J.

## EVENING.

Alexander, Patrick Y.	Gibbs, Thomas J.
Baker, Hiatt, C.	Gibbs, William
Baker, William N.	Gill, John A. G.
Balfour, Andrew	Griffith, David I.
Banks, Herbert	Griffith, Francis J.
Barkla, William (senior)	Hamlyn, William J.
Barkla, William (junior)	Hiley, Alfred R. S.
Blake, Charles	Hill, Walter F.
Blake, John	Hooper, John H.
Bradford, William	Howlett, Percy J.
Brown, Frank R.	Hughes, Llywelyn
Brown, George A.	Humphries, Henry
Burn, Charles	Isaac Herbert K.
Cameron, Peter	Jenkins, John P.
Chandler, Joseph C.	Johnston, T. B.
Chaundy, Frederick W.	Jones-Mortimer, Wilson C.
Church, James	Kane, Bernard
Clifford, J.	Kane, Thomas
Clissold, George	Keevill, Arthur G.
Cogan, William	Knight, William M.
Collins, Herbert E.	Lawrence, Frederick J.
Cooper, Edwin G.	Lawrence, William V.
Cowlin, Frank, N.	Lenny, Charles
Davies, Thomas R.	Lestang, Pierre
Davis, William J. B.	Littleton, George H.
Daws, Arthur	McDowell, Benjamin
Daws, George A.	McDowell, Henry
Derrick, Gilbert W.	Maddock, Charles E.
Dewar, James L.	Marriott, Henry W.
Dunsford, William H. L.	Marsh, Edward H.
Dymond, Walter	Mead, George R.
East, John	Moist, Alfred
East, Thomas	Moore, Edward C.
Eastmead, Frederic J.	Moore, William G.
Edwards, William M.	Morgan, John
Ellis, Frederick	Morgans, Godfrey E.
Essex, Arthur	Morgans, Humphrey M.
Evans, Henry E. R.	Morgans, Thomas
Evans, Malcolm T.	Moulton, Thomas
Farquhar, Edmond A.	Nathan, Alfred N.
Ferris, Thomas H.	Nichols, George
Finch, William J.	Oldham, Herbert J.
Fisher, Joseph	Olver, Richard W.
Flint, Walter	O'Shee, John P.
Fowler, Frank G.	Parsons, Frederick
Gardener, George G.	Peake, Arthur W.
Garrard, George	Peckett, Leonard
Garratt, Samuel T.	Perkins, Thomas L.
Gibbins, Cecil	Platnauer, Jack S.
Gibbs, Alfred H.	Pleasance, Frank

Porter William H.  
 Praeger, Edward W.  
 Price, Alfred N.  
 Price, Arthur N.  
 Price, John H.  
 Price, William J.  
 Purton, Earnest  
 Ray, Arthur W.  
 Ray, William  
 Reed, Sydney C.  
 Righton, William  
 Robertson, James K.  
 Rooke, William A. M.  
 Salanson, Alfred  
 Shaw, John  
 Shaw, Victor A.  
 Simpson, Frederick H.  
 Simpson, Herbert  
 Sinnott, Edward S.  
 Sinnott, George S.  
 Skinner, Willie S.  
 Smith, Charles F.  
 Smith, Sydney

Stagg, William  
 Stiles, William  
 Taylor, John M.  
 Thomas, George  
 Thorne, Gervase  
 Thorne, Thomas  
 Tiley, Arthur J.  
 Trafford, Thomas  
 Trump, John T.  
 Twomey, Thomas H.  
 Usher, Ernest L.  
 Ward, Alfred J.  
 Warren Robert H.  
 Watson, Edward J.  
 Westover, George  
 Whatley, Howard A.  
 White, Francis G.  
 White, Frederick J.  
 White, Henry J.  
 Whitwham, Arthur H.  
 Whitwham, Herbert E.  
 Williams, William P.  
 Wyatt, John

Anderson, Helen S.  
 Barnes, Lucy M.  
 Biggs, Lily S. E.  
 Blinkhorn, Annie M.  
 Blinkhorn, Emily S.  
 Boorne, Minnie  
 Boyle, Alice H.  
 Boyle, Mrs. Alice M.  
 Carter, Lilian E. A.  
 Castle, Henrietta  
 Colborn, Edith  
 Cox, Mary  
 Crossman, Bessie A.  
 Dadley, Margaret  
 Desprez, Edith S.  
 Dunsford, Mrs. Lucy  
 Evans, Frances L.  
 Eyles, Annie E.  
 Farmer, Alice K.  
 Forster, Amy  
 Forster, Mildred  
 Fowler, Alice M.  
 Gabb, Clara  
 Garaway, Alice R.  
 Garaway, Ethel R.  
 Grace, Mary E.  
 Griffiths, Emily C.

Harris, Beatrice J. A.  
 Hewett, Maud E.  
 Hill, Lily  
 Horwood, Clara R.  
 Hunt, Margaret E.  
 Hurley, Louisa  
 Jarvis, Bessie  
 Jones, Margaret E.  
 Kempster, Ada C.  
 Latham, Jessie  
 Lawrence, Edith I.  
 Le Ray, Florence  
 Lloyd, May  
 Macfarlane, Ethelwyn  
 Manch, Fraulein Antoine  
 Marsh, Emily May  
 Morris, Agnes B.  
 Mulley, Alice M.  
 Mulley, Rose E.  
 Naish, Winifred M.  
 Parnall, Elizabeth  
 Phillips, Fanny E.  
 Philpott, Amy  
 Philpott, Gertrude  
 Powell, Annie  
 Powell, Rosalie H. R.  
 Price, Kate

Prince, Louisa  
 Reynolds, Edith  
 Ridley, Lily  
 Richards, Amelia M.  
 Salanson, Annie  
 Salt, Mary A.  
 Sawtell, Charlotte B.  
 Skeates, Florence E.  
 Smith, Helen A.  
 Sowter, Edith J.  
 Stacy, Enid  
 Steadman, Bessie  
 Stephenson-Jellie, Sophie  
 Stiles, Annie

Sturge, Lucy  
 Thomas, Isabel R.  
 Thomas, Louise B.  
 Tod, A. Florence  
 Tomkins, Katherine E.  
 Tuckey, Sarah K.  
 Turner, Mary  
 Veale, Annie  
 Voysey, Clare F.  
 Walters, Blanche E.  
 Waters, Charlotte M.  
 Wood, Kate M.  
 Wright, Elizabeth E.

### ASSISTANT TEACHERS.

Beer, F.  
 Markland, James  
 Matthews, Frank G.  
 Mills, Frederick W.  
 Stephens, George A.

Stokes, William H.  
 Stoneham, Edward R.  
 Watkins, Albert E.  
 White, Samuel E.

Baker, Florence  
 Ball, Louisa  
 Bird, Annie  
 Burgess, Annie  
 Chambers, Margaret G.  
 Clarke, Cathern P.  
 Collard, Sarah J.  
 Dando, Jane  
 Davis, Ada  
 Edwards, Fanny  
 Evans, Annie E.  
 Featherstone, Kate G.  
 Frewin, Helen R.  
 German, Lillie E.  
 Harford, Alice L.  
 Hicks, Florence M.  
 Hooper, Mrs. Lucy H.  
 Hurford, Amelia M.  
 Ireland, Frances M.  
 Jolliffe, Minnie  
 Jones, Lydia E.  
 Langdon, Mrs. Eleanor A.  
 Marsh, Mrs. Kate  
 Matthews, Bertha J. A.  
 May, Eva

Middleton, Margaret  
 Mortimer, Lucy  
 Mullens, May  
 Nelson, Ada  
 Newton, Charlotte E.  
 Nobbs, Emma E.  
 Oaten, Ada E.  
 Organ, Florence  
 Padfield, Bessie E. L.  
 Parks, Gertrude  
 Passmore, Kate I.  
 Pavey, Lily  
 Phillips, Louisa M.  
 Pidgeon, Charlotte  
 Price, Kate E.  
 Prowse, Roseanna M.  
 Radford, Ada  
 Richards, Jessie E.  
 Richards, Martha  
 Ricketts, Ruth E.  
 Sheppard, Lilian  
 Thomas, Lillie P.  
 Towells, Edith E.  
 White, Edith

BRISTOL MEDICAL SCHOOL,  
AFFILIATED TO  
UNIVERSITY COLLEGE,  
BRISTOL.



SESSION 1889-90.



## THE WINTER SESSION

Will commence on TUESDAY, OCTOBER 1st, 1889, and will continue for Six Months, with a Recess at Christmas.

## THE SUMMER SESSION

Will commence on THURSDAY, MAY 1st, 1890, and will terminate at the end of July.

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## ADMISSION OF STUDENTS.

Attendance will be given to enter Students and to issue Cards of Admission to Classes\* on the following days :—

*Winter Session* : TUESDAY, OCTOBER 1st, at 4 p.m.

*Summer Session* : WEDNESDAY, MAY 1st, at 4 p.m.

E. MARKHAM SKERRITT, M.D.,

*Dean.*

MEDICAL SCHOOL, UNIVERSITY COLLEGE,  
TYNDALL'S PARK, BRISTOL.

\* See Regulation 3, Page 10.

## GOVERNING BODY.

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W. PROCTOR BAKER, Esq. (1), Treasurer of University College,  
President of the Bristol General Hospital, *Chairman*.

E. C. BOARD, M.R.C.S., (4), Senior Surgeon to the Bristol Royal  
Infirmiry.

G. F. BURDER, M.D., F.R.C.P. (5), Consulting Physician to the  
Bristol General Hospital.

Rev. J. W. CALDICOTT, D.D. (1)

C. D. CAVE, Esq. (2), President of the Bristol Royal Infirmiry.

ALBERT FRY, Esq. (1), Chairman of the Council of University  
College.

LEWIS FRY, Esq., M.P. (1), Vice-Chairman of the Council of  
University College.

E. LONG FOX, M.D., F.R.C.P. (4), Consulting Physician to the  
Bristol Royal Infirmiry.

HENRY MARSHALL, M.D., F.R.C.S. Ed., F.R.S.E. (5), Con-  
sulting Surgeon to the Bristol General Hospital.

Professor B. JOWETT, M.A. (1), Master of Balliol College, Oxford.

F. P. LANSDOWN, M.R.C.S. (5), Senior Surgeon to the Bristol  
General Hospital.

HENRY NAISH, Esq. (3), Treasurer of the Bristol General  
Hospital.

AUGUSTIN PRICHARD, F.R.C.S. (4), Consulting Surgeon to  
the Bristol Royal Infirmiry.

E. MARKHAM SKERRITT, M.D. Lond., B.S., B.A., F.R.C.P.  
(6), Senior Physician to the Bristol General Hospital,  
Joint Lecturer on Medicine at the Medical School, and  
Dean of the Faculty, *Secretary*.

R. SHINGLETON SMITH, M.D. Lond., B.Sc., F.R.C.P. (6),  
Senior Physician to the Bristol Royal Infirmiry, Joint  
Lecturer on Medicine at the Medical School.

- 
1. Elected by the Council of University College.
  2. Elected by the Committee of the Bristol Royal Infirmiry.
  3. Elected by the Committee of the Bristol General Hospital.
  4. Elected by the Staff of the Bristol Royal Infirmiry.
  5. Elected by the Staff of the Bristol General Hospital.
  6. Elected by the Faculty of the Bristol Medical School.

## COURSES OF LECTURES.

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### WINTER SESSION.

#### MEDICINE.

- E. MARKHAM SKERRITT, M.D. Lond., B.S., B.A., F.R.C.P.  
Senior Physician to the Bristol General Hospital; and  
R. SHINGLETON SMITH, M.D. Lond., B.Sc., F.R.C.P., Senior  
Physician to the Bristol Royal Infirmary.

#### SURGERY.

- NELSON C. DOBSON, F.R.C.S., Surgeon to the Bristol General  
Hospital; and  
J. GREIG SMITH, M.A., M.B., C.M., F.R.S.E., Surgeon to the  
Bristol Royal Infirmary.

#### DESCRIPTIVE AND SURGICAL ANATOMY.

- WILLIAM H. HARSANT, F.R.C.S., Surgeon to the Bristol  
Royal Infirmary.

#### PRACTICAL ANATOMY.

- DEMONSTRATOR*—P. WATSON WILLIAMS, M.B. Lond.,  
Assistant Physician to the Bristol Royal Infirmary.

This Department is under the superintendence of the Lecturer on Anatomy. The Demonstrator and the Medical Tutor direct the Students in their dissections.

#### PHYSIOLOGY.

- LECTURER*—G. MUNRO SMITH, M.R.C.S., L.R.C.P., Assistant  
Surgeon to the Bristol Royal Infirmary.  
*ASSISTANT LECTURER*—J. MICHELL CLARKE, M.A.,  
M.B. Cantab., M.R.C.P., Assistant Physician to the  
Bristol General Hospital.  
*PHYSIOLOGICAL ASSISTANT*—T. C. GREY.

#### HYGIENE.

- DAVID S. DAVIES, M.B. Lond., D.P.H. Cantab., Medical Officer  
of Health to the City and County of Bristol.

## SUMMER SESSION.

### MIDWIFERY AND DISEASES OF WOMEN.

JOSEPH G. SWAYNE, M.D. Lond., Consulting Physician-Accoucheur to the Bristol General Hospital; and

A. E. AUST LAWRENCE, M.D., Physician-Accoucheur to the Bristol General Hospital.

### MEDICAL JURISPRUDENCE.

REGINALD EAGER, M.D. Lond. ; and

ALFRED J. HARRISON, M.B. Lond., Physician to the Bristol General Hospital.

This Course includes Lectures on the various forms of Insanity.

### PATHOLOGY AND MORBID ANATOMY.

BARCLAY J. BARON, M.B., C.M. Edin., Physician to the Bristol General Hospital.

### PRACTICAL PATHOLOGY AND MORBID ANATOMY.

BARCLAY J. BARON, M.B., C.M. Edin., Physician to the Bristol General Hospital.

### OPERATIVE SURGERY.

W. J. PENNY, F.R.C.S., Surgeon to the Bristol General Hospital.

In this Course each Student performs Surgical operations on the dead body.

### PRACTICAL SURGERY.

ARTHUR W. PRICHARD, M.R.C.S., Surgeon to the Bristol Royal Infirmary.

This Course includes the following subjects : The application of anatomical facts to Surgery, on the living person and on the dead body. The methods of proceeding and the manipulations necessary in order to detect the effects of disease and accidents on the living person and on the dead body. The use of Surgical apparatus.

### MATERIA MEDICA AND THERAPEUTICS.

ARTHUR B. PROWSE, M.D. Lond., F.R.C.S., Physician to the Bristol Royal Infirmary.

**PRACTICAL PHYSIOLOGY AND HISTOLOGY.**

GEORGE F. ATCHLEY, M.B. Lond., Consulting Surgeon to the  
Bristol General Hospital.

*PHYSIOLOGICAL ASSISTANT*—T. C. GREY.

This Course includes instruction in the use of the microscope, the examination of the various tissues and organs of the body, and the use of physiological instruments and apparatus.

Each Student is required to provide himself with an efficient microscope and accessory apparatus.

**BOTANY.**

ADOLPH LEIPNER, Professor of Botany in University College.

The Botanical Garden attached to University College affords to Students abundant opportunity for practical work in connection with this Class.

**CHEMISTRY AND CHEMICAL PHYSICS.**

THOMAS COOMBER, F.C.S., Master of the Bristol Trades and  
Mining Schools.

**PRACTICAL CHEMISTRY.**

THOMAS COOMBER, F.C.S., Master of the Bristol Trades and  
Mining Schools.

**COMPARATIVE ANATOMY.**

C. LLOYD MORGAN, F.G.S., Professor of Geology and Zoology  
in University College.

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*MEDICAL TUTOR*—F. H. EDGEWORTH, B.A., M.B. Cantab.,  
B.Sc. Lond.

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**DENTAL COURSES.**

Lectures are given in conformity with the regulations for the  
Licence in Dental Surgery of the Royal College of Surgeons.

# TIME TABLE.

WINTER SESSION.								SUMMER SESSION.							
Classes.	M.	Tu.	W.	Th.	F.	S.	Hours.	Classes.	M.	Tu.	W.	Th.	F.	S.	Hours.
Physiology ... ..	×	×	×	×	×	×	10 a.m.	Practical Physiology .	×		×		×		8 a.m.
Anatomy ... ..	×	×	×	×	×	×	9 a.m.	Botany ... ..		×		×		×	10 a.m.
Anatomical Demon- strations ... ..	×	×	×	×	×		11 a.m.	Chemistry ... ..		×		×		×	8 a.m.
Medicine .. ..	×		×		×		9 a.m.	Practical Chemistry...	×		×		×		9 a.m.
Surgery ... ..		×		×		×	9 a.m.	Materia Medica...		×		×		×	9 a.m.
Hygiene ... ..	×				×		10 a.m.	Midwifery ... ..	×	×	×	×	×		8 a.m.
								Practical Surgery ...		×		×		×	9 a.m.
								Pathology ... ..	×		×		×		9 a.m.
								Practical Pathology...		×		×		×	8.30 a.m.
								Operative Surgery ...		×	×		×		10 a.m.
								Medical Jurisprudence	×			×		×	10 a.m.
								Comparative Anatomy	×		×		×		9 a.m.

## HOSPITAL PRACTICE.

*Royal Infirmary*—Medical and Surgical Practice, at 12 noon daily. Operations, Tuesday and Friday, at 1 p.m.  
*General Hospital*—Medical and Surgical Practice, at 1 p.m. daily. Operations, Thursday, at 1.30 p.m.

## F E E S .

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PHYSIOLOGY	...	...	...	...	} £5 5s. for each Course.
ANATOMY	...	...	...	...	
MEDICINE	...	...	...	...	
SURGERY	...	...	...	...	
MIDWIFERY	...	...	...	...	
COMPARATIVE ANATOMY	...	...	...	...	} £4 4s. for each Course.
PRACTICAL PHYSIOLOGY	...	...	...	...	
PRACTICAL ANATOMY	...	...	...	...	
BOTANY	...	...	...	...	} £3 3s. for each Course.
PRACTICAL CHEMISTRY	...	...	...	...	
MATERIA MEDICA	...	...	...	...	
PRACTICAL SURGERY	...	...	...	...	
OPERATIVE SURGERY	...	...	...	...	
PATHOLOGY	...	...	...	...	
PRACTICAL PATHOLOGY	...	...	...	...	
MEDICAL JURISPRUDENCE	...	...	...	...	} £2 2s. for each Course.
PRACTICAL CHEMISTRY (Special Course for M.B. Lond.)	...	...	...	...	
HYGIENE	...	...	...	...	— £2 2s. for each Course.

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**MEDICAL TUTOR FEE.**—Students of Anatomy, Physiology, or Practical Physiology are required to pay a Medical Tutor Fee of £2 2s. *per annum*.

**COMPOSITION FEE.**—A Composition Fee of Sixty Guineas is received, which entitles the Student to the full Courses of Lectures required for the Diplomas of the Conjoint Examining Board of the Royal College of Physicians of London and the Royal College of Surgeons of England, the Degrees of the University of London,\* the Diploma of the Society of Apothecaries, and the Examinations of the Army and Navy Boards. The Fee includes instruction by the Medical Tutor for two years. Should any Student fail to attend any Course with sufficient regularity, unless from illness or other cause deemed satisfactory, he will have to attend again, and to pay the Fee for such Course beyond what he has already paid in the Composition Fee.

The Composition Fee may be paid in one sum, at the commencement of the first Session; or in two instalments, of 40 guineas at the beginning of the first Session, and 20 guineas at the beginning of the second Session.

In the case of Students who do not require the Courses of the Preliminary Summer Session (see p. 11), the Composition Fee is Fifty Guineas, payable in a similar manner, either in one sum or in two instalments of 30 guineas and 20 guineas.

**HOSPITAL PRACTICE.**—For Fees for Hospital Practice see pp. 19 and 25.

\* The Special Course of Practical Chemistry required for the M.B. Degree is not included in the Composition Fee.



## INFORMATION FOR STUDENTS.

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Every Student, prior to the commencement of professional studies, is required to pass one of the Preliminary Examinations in Arts prescribed by the General Medical Council. [See foot-note.] After having passed such an examination he must be registered as a Student of Medicine at the office of the Medical Council (299 Oxford Street, London). Information on these subjects may be obtained from the Dean of the Bristol Medical School.

Students can complete in Bristol the entire course of study required for the Medical and Surgical Degrees of the University of London, for the Diplomas of the Royal College of Physicians of London, and the Royal College of Surgeons of England and the Apothecaries' Society of London, and for the Examinations of the Army and Navy Boards. The lectures and instruction given at University College, Bristol, are adapted to the various Preliminary Arts Examinations above referred to, and also to the Matriculation\* and Preliminary Scientific Examinations of the University of London; while the Medical School, the Royal Infirmary, and the General Hospital together provide for every detail of the professional curriculum required by the University of London and the above Examining Boards.

A Student can most advantageously conform to the regulations of the Conjoint Board of the Colleges by entering in the Summer rather than in the Winter Session.

Every Student is required to pursue his medical studies for a period of four years from the date of registration before he can present himself for final examination and obtain a licence to practice. The period during which a Student must attend lectures and hospital practice, and the regulations as to the course of study, vary according to the degree or diploma he may wish to obtain. The lectures and hospital practice required by the Royal Colleges of Physicians and Surgeons and the Apothecaries' Society *can* be attended in three years, but candidates for the diplomas of these bodies must be engaged in the acquirement of professional knowledge during a fourth year. It is, therefore, strongly recommended that the compulsory work should not be compressed into the

\* The University of London holds Matriculation Examinations at University College, Bristol, as one of its provincial centres, in June; and the Preliminary Examinations of the College of Preceptors, which are also recognised by the General Medical Council, are held at University College, Bristol, in March, June, September, and December. Full particulars respecting these Examinations may be obtained on application to the Registrar, at the College.

minimum time allowed, but should be distributed over the whole period of four years, according to the plan laid down on pages 11, 12, and 13. Thus ample time will be permitted for the effectual study of each subject in its proper place in the curriculum, and the Student will be able to devote himself solely to the subjects of the several Examinations as the time for passing them arrives.

All necessary information as to the course to be pursued for any particular degree or diploma will be given by the Dean of the Bristol Medical School. Further particulars regarding the Infirmary may be obtained from the Dean of the Infirmary Faculty, Dr. Prowse, and respecting the Hospital from the Dean of the Hospital Faculty, Dr. Markham Skerrett.

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## GENERAL REGULATIONS.

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1. Every Candidate for admission as a Student is required to produce a satisfactory testimonial of good character.

2. Every Student on his admission is required to subscribe in the General Register a declaration of acquiescence in the Regulations of the School.

3. Cards of admission to Classes can be obtained only of the Dean, to whom all fees are to be paid in advance. The cards are to be taken to be countersigned by the Lecturers respectively, and *attendance on each Class dates from such signature.*

4. The attendance of Students on Lectures is registered. Periodical Examinations are held in all the Classes in accordance with the requirements of the Examining Boards, and attendance on these Examinations is essential.

5. A Student intending to present himself for examination before any Examining Board is required to give due notice to the Dean, and to pass a Test Examination in those subjects on which he will be examined.

6. No Student will be allowed to enter upon the work of the Summer Session of the Second Year until he has passed the Second Examination of the Conjoint Examining Board of the Royal College of Physicians of London and the Royal College of Surgeons of England, or the equivalent Examination of some other Examining Board.

7. In the event of faulty attendance, idleness, or misconduct on the part of any Student, the same will be reported to his parents or guardians after the succeeding Class Prize Examinations.

8. Certificates of attendance will be withheld from any Student whose conduct or attendance shall be deemed unsatisfactory.

9. The discipline of the School generally is under the charge of the Dean, or, in his absence, of the Medical Tutor, who will report any instances of misconduct. During the attendance of a Lecturer in any room for the purpose of teaching, he is charged with the maintenance of order therein.

10. The power of expelling any Student for misconduct, whether within the precincts of the School or elsewhere, or for idleness, is vested in the Governing Body.

## MEDICAL TUTOR.

The Medical Tutor is in constant attendance at the School to assist Students in their studies.

## ORDER OF STUDY.

### Preliminary Summer Session.

Botany.  
Materia Medica.  
Chemistry and Chemical Physics.  
Practical Chemistry.  
Practical Pharmacy.

## FIRST YEAR.

### Winter Session.

Anatomy (Elementary).  
Physiology (Elementary).  
Dissections.  
Surgical Hospital Practice.  
*Post Mortem* Demonstrations.

### Summer Session.

Practical Physiology and Histology  
and Physiological Chemistry.  
Surgical Hospital Practice.  
Examination of Surgical Patients.  
*Post Mortem* Demonstrations.

## SECOND YEAR.

## Winter Session.

Anatomy.  
 Physiology.  
 Dissections.  
 Medical Hospital Practice.  
 Surgical Hospital Practice.  
*Post Mortem* Demonstrations.  
 Surgical Clinical Lectures.

*Note.—The Second Examination in Anatomy and Physiology must now be passed. See Regulation 6, page 10.*

## Summer Session.

Midwifery.  
 Practical Surgery.  
 Medical Hospital Practice.  
 Medical Clinical Lectures.  
 Surgical Hospital Practice.  
 Surgical Clinical Lectures.  
*Post Mortem* Demonstrations.

## THIRD YEAR.

## Winter Session.

Medicine.  
 Surgery.  
 Medical Hospital Practice.  
 Medical Clinical Lectures.  
 Surgical Hospital Practice.  
 Surgical Clinical Lectures.  
*Post Mortem* Demonstrations.

## Summer Session.

Medical Jurisprudence.  
 Pathology and Morbid Anatomy.  
 Practical Pathology and Morbid Anatomy.  
 Operative Surgery.  
 Medical Clinical Lectures.  
 Medical Hospital Practice.  
 Surgical Hospital Practice.  
 Surgical Clinical Lectures.  
*Post Mortem* Demonstrations.

## FOURTH YEAR.

## Winter Session.

Hygiene.  
 Medical Hospital Practice.  
 Medical Clinical Lectures.  
*Post Mortem* Demonstrations.

**DRESSERSHIPS.**—Students must pass the Second Examination of the Conjoint Board of the Colleges, or the Equivalent Examination of some other Examining Board, before becoming In-patient Dressers.

**CLINICAL CLERKSHIPS** may be most advantageously held in the fourth year.

**PRACTICAL MIDWIFERY.**—Students who have attended the Midwifery Course will be provided with cases to attend, under competent supervision.

CLINICAL STUDY OF THE DISEASES OF WOMEN.—Three months must be devoted to this subject in the third or the fourth year.

INSTRUCTION IN VACCINATION may conveniently be obtained in the third or the fourth year.

SPECIAL CLINICAL DEPARTMENTS.—Students are strongly advised to attend the practice of these Departments during their fourth year.

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## PRIZES AND CERTIFICATES OF HONOUR.

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Prizes and Certificates of Honour are publicly distributed at the beginning of each Summer Session to the Students who have been successful in the Examinations of the year.

No Prize can be obtained twice by the same Student.

Prizes and Certificates of Honour are awarded in *each* of the following subjects:

FOR FIRST YEAR'S STUDENTS.—Anatomy and Physiology—Chemistry—Materia Medica—Practical Physiology and Histology—Botany—Practical Chemistry.

FOR SECOND YEAR'S STUDENTS.—Anatomy—Physiology—Practical Anatomy—Midwifery—Practical Surgery.  
*Certificates* in Comparative Anatomy.

FOR THIRD YEAR'S STUDENTS.—Medicine (open to Students of the third or the fourth year)—Surgery—Pathology—Practical Pathology and Morbid Anatomy—Medical Jurisprudence—Operative Surgery.

FOR FOURTH YEAR'S STUDENTS.—Hygiene.

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## HOSPITAL PRACTICE AND CLINICAL LECTURES.

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Hospital Practice may be attended either at the Bristol Royal Infirmary or at the Bristol General Hospital. See pages 15 and 22.

# BRISTOL ROYAL INFIRMARY.

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## Honorary and Consulting Physicians:

FREDERICK BRITTAN, M.D.  
EDWARD LONG FOX, M.D.  
WILLIAM H. SPENCER, M.A., M.D. Cantab.

## Honorary and Consulting Surgeons:

JOHN HARRISON, F.R.C.S.  
AUGUSTIN PRICHARD, F.R.C.S.

## Physicians:

R. SHINGLETON SMITH, M.D. Lond., B.Sc., F.R.C.P.,  
*Lecturer on Medicine at the Medical School.*  
HENRY WALDO, M.D., M.R.C.P.  
JOHN E. SHAW, M.B. Edin.  
ARTHUR B. PROWSE, M.D. Lond., F.R.C.S.,  
*Lecturer on Materia Medica at the Medical School.*

## Obstetric Physician:

ERNEST WEDMORE, M.A., M.B. Cantab., M.R.C.S.

## Assistant Physician:

P. WATSON WILLIAMS, M.B. Lond.,  
*Demonstrator of Anatomy at the Medical School.*

## Surgeons:

EDMUND C. BOARD, M.R.C.S.  
ARTHUR W. PRICHARD, M.R.C.S.,  
*Lecturer on Practical Surgery at the Medical School.*  
J. GREIG SMITH, M.A., M.B., C.M.  
*Lecturer on Surgery at the Medical School.*  
W. H. HARSANT, F.R.C.S.,  
*Lecturer on Anatomy at the Medical School.*  
J. PAUL BUSH, M.R.C.S.

## Ophthalmic Surgeon:

F. RICHARDSON CROSS, M.B. Lond., F.R.C.S.

## Dental Surgeon:

W. R. ACKLAND, M.R.C.S.

## Assistant Surgeon:

G. MUNRO SMITH, M.R.C.S., L.R.C.P.,  
*Lecturer on Physiology at the Medical School.*

## House Surgeon:

J. SWAIN, M.D., B.S. Lond.

## House Physician:

W. J. HILL, M.R.C.S., L.R.C.P.

## Junior House Surgeon:

J. NORTON, M.B. Lond.

## Junior House Physician:

J. H. FARDON, M.R.C.S., L.R.C.P.



THE Infirmary was founded in the year 1735, and is one of the largest provincial hospitals in England. It contains 264 beds.

It includes a large ward exclusively appropriated to children, separate wards for eye cases, a service of beds devoted to the treatment of diseases peculiar to Women, and two wards apart from the main building for cases requiring isolation. It is provided with all the necessary appliances for a complete clinical education.

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### IN-PATIENTS.

Medical and Surgical cases are admitted daily at eleven o'clock.

### OUT-PATIENTS.

The Out-patient department is very extensive, and the whole of its resources are utilised for the instruction of Students. This department is under the charge of the Physicians and Surgeons, the Assistant Physician and the Assistant Surgeon. Students have opportunities for examining the cases, and are instructed in diagnosis and modes of treatment. For Students this department is of very great value, as the diseases treated in it constitute the large majority of ordinary cases met with in practice.

### THE LIBRARY

contains nearly 3,000 volumes, comprising most of the standard works on Medicine, Surgery, and the cognate sciences; also the Medical periodicals of the day. Students are allowed to take home any books they may require.

### THE MUSEUM

*(Founded by Richard Smith, Esq., formerly Surgeon to the Infirmary)* is open to all Students, under the supervision of the Curator. It contains a very large series of preparations of diseased bones; a remarkable collection of calculi, including upwards of 500 groups; numerous pathological preparations, arranged with a special view to the study of Pathology; a Materia Medica collection; and a large collection of illustrative microscopic slides.

A Preparation Room and a Histological Room are attached to the Museum, in which the Students have the opportunity of working under instruction and supervision.



## THE DISPENSARY AND LABORATORY.

In this department Students are instructed in Practical Pharmacy, the analysis of urine, and other chemical manipulations connected with practical medicine.

## CLINICAL INSTRUCTION.

**In the Wards.**—The wards are visited daily, by the Physicians at twelve o'clock and by the Surgeons at one o'clock, when Clinical instruction is given to the Students in attendance.

On Saturdays the Physicians meet at one o'clock, and the Surgeons meet at half-past one o'clock, in the wards, for consultation on such cases as may require it.

**In the Out-Patient Department.**—Instruction is given by the Physicians and Surgeons, the Assistant Physician and the Assistant Surgeon. A special system of Instruction and Dressing is organised for First Year's Students in this department.

**Operations** are performed, except in cases of emergency, on Tuesdays and Fridays at one o'clock.

**Clinical Lectures** are given regularly during the Winter and Summer Sessions, by the Physicians on Saturdays at twelve o'clock, and by the Surgeons on Fridays at twelve o'clock. Attendance on these lectures is registered, and certificates are given accordingly.

**Post Mortem Examinations** are conducted at twelve o'clock under the direction of one of the Physicians or Surgeons or the Pathologist. Demonstrations are given on the cases to the Students in attendance at a quarter to one o'clock.

Instruction is also given in the following

## SPECIAL CLINICAL DEPARTMENTS.

**Diseases of the Eye.**—Demonstrations and instruction in Diseases of the Eye and the use of the Ophthalmoscope are given in the Out-patient department by Mr. Arthur W. Prichard on Thursdays at eleven o'clock, and by Mr. F. Richardson Cross on Mondays at one o'clock. Clinical instruction is given by Mr. Cross in his wards.

**Diseases of Women.**—Clinical instruction in the diseases peculiar to Women is given by Dr. Wedmore on Tuesdays, Thursdays, and Saturdays at half-past eleven o'clock. Lying-in cases are attended by Senior Students, under the immediate oversight of the Obstetric Physician, who periodically gives short courses of practical teaching in Midwifery.

**Diseases of the Ear.**—Demonstrations and instructions are given by Mr. Harsant on Tuesdays at eleven o'clock.

**Diseases of the Skin.**—Patients are seen by Dr. Waldo at half-past twelve on Thursdays.

**Diseases of the Teeth.**—Mr. W. R. Ackland sees patients at one o'clock on Tuesdays and Fridays.

**Diseases of Children.**—Special facilities are afforded for the study of Children's Diseases in the ward set apart for the purpose.

### CLINICAL APPOINTMENTS.

**Dresserships.**—Students are appointed to Dresserships after passing the Second Examination of the Conjoint Board or an equivalent examination. Dressers attend to the patients in the wards and in the Out-patient department, and assist at operations under the direction of the Surgeons.

**Resident Dresserships.**—Students are appointed by the Surgeons from the most diligent and qualified of the Dressers to reside in the Infirmary in weekly rotation. They are in charge of all casualties, under the supervision of the resident Medical Officers. By this privilege, and from the number of accidents happening in the factories, among the shipping, and in the neighbourhood generally, they have more than ordinary opportunities for learning Practical Surgery.

**Clinical Clerkships.**—Students are appointed to Clinical Clerkships in their fourth year of study. The Clinical Clerks alone have the privilege of keeping the case-books and visiting the wards by themselves, and they receive special Clinical instruction.

**Pathological Clerkships.**—One or two Pathological Clerks are appointed every four months from those Students who send in their names for the office. It is their duty to make all *Post Mortem* Examinations and keep the Pathological Register during their term of office, under the direction of one of the Physicians or Surgeons or the Pathologist.

**Obstetric Clerkships.**—Students who have attended lectures on Midwifery, and also entered to the Medical practice of the Infirmary, may take out an Obstetric Clerkship under the Physician in charge of the Obstetric department. The Obstetric Clerks have the privilege of keeping the case-books and assisting at operations and examinations of patients.

**Ophthalmic Clerkships.**—Senior Students may take out Clerkships under the Ophthalmic Surgeon.

## SCHOLARSHIPS AND PRIZES.

I.—*Two Entrance Scholarships*, of the value of Thirty-five Guineas and Ten Guineas respectively, are offered for competition annually on the third Saturday in October. The competition is open to Perpetual Students of the Infirmary who shall have begun the study of Medicine at that institution in the current Winter or in the previous Summer Session. The examination is in subjects of general education.

II.—*Suple Medical Prize* (consisting of a Gold Medal, value Five Guineas, and Seven Guineas in money). Bequeathed by the late ROBERT SUPLE, Esq. Open to Students in their fourth year of study at the Royal Infirmary and Bristol Medical School, who have had no previous study at a recognised Medical School.

III.—*Suple Surgical Prize* (consisting of a Gold Medal, value Five Guineas, and Seven Guineas in Money). Open to Students in their third year of study at the Infirmary and Bristol Medical School, who have had no previous study at a recognised Medical School.

IV.—*Clark Prize*.—Bequeathed by the late HENRY CLARK, Esq., Consulting Surgeon to the Infirmary. Value, Fifteen Guineas. Awarded annually to that Student who, being in his third year of study at the Infirmary and Bristol Medical School, shall obtain the highest aggregate number of marks in the Class Examinations open to Students of the third year, held at the Bristol Medical School.

V.—*Tibbits' Memorial Prize*. Founded by public subscription. Value, Nine Guineas. Open annually to Students of the Infirmary not possessing a Medical or Surgical qualification, for proficiency in Practical Surgery.

VI.—*Crosby Leonard Prize*. Bequeathed by the late CROSBY LEONARD, Esq., Consulting Surgeon to the Infirmary. Value, Seven Guineas. Awarded annually to that Student who, during the third year of his attendance upon the Surgical practice of the Infirmary, shall, in the opinion of the Surgeons, furnish the best written reports of ten Surgical cases occurring in the Surgical wards of the Infirmary.

VII.—*Midwifery Prize*. Value, Three Guineas in Books. Awarded annually after a practical Examination of those Students

who, to the satisfaction of the Obstetric Physician, have conducted twenty cases in connection with the Infirmary.

VIII.—*Pathological Prizes.* Value, Three Guineas. Awarded to the Pathological Clerks at the expiration of their term of office (four months) if their duties have been performed to the satisfaction of the Faculty. Three or more such prizes are awarded annually.

### ADMISSION OF STUDENTS.

Students may enter for Medical or Surgical practice for six months or more. Those who enter for Medical or Surgical practice are entitled to attend the practice of all the Physicians or all the Surgeons at the usual daily visits, and to attend Clinical lectures and the instruction in the special departments. Those who also take out Clinical Clerkships or Dresserships attach themselves to some one Physician or Surgeon in particular, under whose direction they act and from whom they receive special Clinical instruction.

Application for information and admission to be made to the Dean of the Faculty, Dr. ARTHUR B. PROWSE.

### FEEES.

An Entrance Fee of Two Guineas to the Infirmary, and Subscription of One Guinea per annum to the Library.

	Six Months.	One Year.	Perpetual.
Medical Practice ... ..	7 Guineas	12 Guineas	20 Guineas
Surgical Practice ... ..	7   ,,	12   ,,	20   ,,
Medical and Surgical	} ... ..	} ...20   ,,	} 35   ,,
Practice together, in one payment ... ..			

*The above Fees include Clinical Lectures.*

Clinical Clerkship ... ..	5 Guineas for six months.
Dressership ... ..	5   ,, for six months.
Obstetric Clerkship ... ..	3   ,, for three months.
Ophthalmic Clerkship ... ..	3   ,, for three months.

*Fees are payable to the DEAN OF THE FACULTY, with the exception of that for*

Practical Pharmacy ... .. 3 Guineas,  
*which is to be paid to the Secretary of the Infirmary.*

# BRISTOL ROYAL INFIRMARY.

## TIME TABLE OF CLINICAL INSTRUCTION.

	MONDAY.	TUESDAY.	WEDNESDAY.	THURSDAY.	FRIDAY.	SATURDAY.
Visits to Wards. Medical.	12.0 <i>Dr. Prouse.</i>	12.0 <i>Dr. Smith.</i>	12.0 <i>Dr. Shaw.</i>	12.0 <i>Dr. Waldo.</i>		1.0 <i>Consultations.</i>
Visits to Wards. Surgical.	1.0 <i>Mr. Greig Smith.</i>	1.0 <i>Mr. Board.</i>	1.0 <i>Mr. Harsant.</i>	1.0 <i>Mr. Bush.</i>	1.0 <i>Mr. Prichard.</i>	1.30 <i>Consultations.</i>
Operations.		1.0			1.0	
Clinical Lectures.					12.0 <i>Surgical.</i>	12.0 <i>Medical.</i>
Medical Out-Patients.	11.30 <i>Dr. Williams.</i>	12.0 <i>Dr. Waldo.</i>	11.30 <i>Dr. Prouse.</i>	12.0 <i>Dr. Williams.</i>	12.30 <i>Dr. Shaw.</i>	11.30 <i>Dr. Williams.</i>
Surgical Out-Patients.	11.30 <i>Mr. Munro Smith.</i>	11.30 <i>Mr. Bush.</i>	11.30 <i>Mr. Munro Smith</i>	12.30 <i>Mr. Prichard.</i>	11.30 <i>Mr. Munro Smith.</i>	11.30 <i>Mr. Munro Smith</i>
Diseases of Eye.	1.0 <i>Mr. Cross.</i>			12.0 <i>Mr. Prichard.</i>		
Diseases of Ear.		12.0 <i>Mr. Harsant.</i>				
Diseases of Women.		11.30 to 1.30 <i>Dr. Wedmore.</i>		11.30 to 1.30 <i>Dr. Wedmore.</i>		11.30 to 1.30 <i>Dr. Wedmore.</i>
Diseases of Skin.				12.30 <i>Dr. Waldo.</i>		
Diseases of Teeth.		1.0 <i>Mr. Ackland.</i>			1.0 <i>Mr. Ackland.</i>	
<i>Post Mortem</i> Demonstrations.	At 12.45 o'clock.					

# BRISTOL GENERAL HOSPITAL.

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Honorary and Consulting Physician :

GEORGE F. BURDER, M.D., F.R.C.P.

Honorary and Consulting Surgeons :

ROBERT W. COE, F.R.C.S.

HENRY MARSHALL, M.D., F.R.C.S. Edin., F.R.S. Edin.

GEORGE F. ATCHLEY, M.B. Lond.

Honorary and Consulting Physician-Accoucheur :

JOSEPH G. SWAYNE, M.D. Lond.,

*Lecturer on Midwifery at the Medical School.*

Physicians :

E. MARKHAM SKERRITT, M.D. Lond., B.S., B.A., F.R.C.P.,

*Lecturer on Medicine at the Medical School.*

ALFRED J. HARRISON, M.B. Lond.,

*Lecturer on Medical Jurisprudence at the Medical School.*

BARCLAY J. BARON, M.B., C.M. Edin.,

*Lecturer on Pathology and Morbid Anatomy and on Practical Pathology and Morbid Anatomy at the Medical School.*

Surgeons :

F. POOLE LANSDOWN, M.R.C.S.

NELSON C. DOBSON, F.R.C.S.,

*Lecturer on Surgery at the Medical School.*

CHARLES F. PICKERING, F.R.C.S.

WILLIAM J. PENNY, F.R.C.S.,

*Lecturer on Operative Surgery at the Medical School.*

Physician-Accoucheur :

A. E. AUST LAWRENCE, M.D.,

*Lecturer on Midwifery and Diseases of Women at the Medical School.*

Assistant Physician :

J. MICHELL CLARKE, M.A., M.B. Cantab., M.R.C.P.,

*Assistant Lecturer on Physiology at the Medical School.*

Assistant Surgeon :

W. M. BARCLAY, F.R.C.S.

Pathologist :

J. MICHELL CLARKE, M.A., M.B. Cantab., M.R.C.P.,

*Assistant Lecturer on Physiology at the Medical School.*

Dental Surgeon :

T. COOKE PARSON, M.R.C.S.,

*Lecturer on Dental Mechanics at the Medical School.*

House Surgeon :

W. H. C. NEWNHAM, M.A., M.B. Cantab.

Physician's Assistant :

HEDLEY HILL, M.R.C.S.

Assistant House Surgeon :

C. A. GRIFFITHS, M.R.C.S.



THE Hospital, founded in 1822, is situated in a populous district near the Docks, Collieries, Manufactories, and Railway Stations, from which sources the wards are supplied with a great variety of important cases.

The present building was completed and occupied in 1858, and is furnished with many modern improvements. It contains 200 beds, with special Gynæcological and Children's wards, also Private wards and a separate building for cases requiring isolation.

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### OUT-PATIENT DEPARTMENT.

This department affords a large and most valuable field of observation. It is under the care of the Physicians and the Surgeons, the Physician-Accoucheur, the Assistant Physician, and the Assistant Surgeon, by whom the Students are instructed in the practical examination of patients and the treatment of the various forms of disease here met with.

*In-patients* are admitted daily (Sundays excepted) at half-past twelve o'clock.

*Out-patients* are admitted daily at the same hour.

*Casualties*.—Emergencies and casualties are admitted at all hours by the Resident Medical Officers.

### SCHOLARSHIPS AND MEDALS.

*Lady Haberfield Entrance Scholarship*.—This Scholarship, founded in 1875, of the value of Thirty Guineas, the interest of £1,000, bequeathed for the purpose by the late Lady HABERFIELD, is awarded annually at the commencement of the Winter Session, after a competitive examination in subjects of general education.

*Second Entrance Scholarship*.—An additional Entrance Scholarship of the value of £20 is awarded when more than six candidates present themselves.

*Clarke Scholarship*.—A Surgical Scholarship, of the value of £15, founded by H. M. CLARKE, Esq., of London, is awarded annually at the end of the Winter Session, after an examination in Surgery.

*Sanders' Scholarship*.—A Scholarship founded by the late JOHN NASH SANDERS, Esq., of the value of £22 10s., is awarded annually at the end of the Winter Session, after examination in Medicine, Surgery, and Diseases of Women.



*Martyn Memorial Pathological Scholarships.*—Founded in 1878, by public subscription, in memory of the late Dr. SAMUEL MARTYN, Physician to the Hospital. *Two Scholarships*, each of the value of £10, are awarded annually: one at the end of the Summer Session, and one at the end of the Winter Session. A Student may, at the option of the Faculty, hold both these Scholarships. After a competitive examination in Pathology and Morbid Anatomy, the successful candidate is appointed Pathological Clerk to the Hospital for the term of six months.

*Committee Gold Medal.*—This Medal, presented by the Committee of the Hospital, is awarded annually at the end of the Winter Session to the Student of the fourth year who has most distinguished himself during his career at the Hospital and the Medical School.

*Committee Silver Medal.*—This Medal, presented by the Committee of the Hospital, is awarded annually at the end of the Winter Session to the next most distinguished Student of the fourth year.

The rules relating to the several Scholarships may be had on application.

### THE LIBRARY.

The Library, with a commodious Reading Room, contains a good and increasing collection of Medical works, the principal Journals, excellent Microscopes, and other physical apparatus.

Instruction in the use of the Microscope and Chemical Analysis, in connection with the Clinical teaching, is given by the Faculty.

Students are allowed to take home any books they may require.

### THE MUSEUM.

The Museum contains numerous interesting and instructive specimens. Pathological Clerks are appointed from the Students of the Hospital. (See Martyn Memorial Scholarships, above.)

### CLINICAL INSTRUCTION.

The whole of the practice of the Hospital, including the Special departments mentioned below, is open to the Students of the Hospital.

**Wards.**—The wards are visited daily by the Physicians and the Surgeons at half-past one, when general Clinical Instruction is given.

**Out-Patient Department.**—Instruction is given daily by the Physicians and the Surgeons, the Assistant Physician, and the Assistant Surgeon. Students are specially advised to avail themselves of the opportunity which this department affords of acquiring accuracy in the physical examination of patients and the diagnosis and treatment of disease.

**Operations.**—General surgical operations, except in cases of emergency, are performed on Thursdays, at half-past one o'clock, and ophthalmic operations at the same hour on Mondays.

**Clinical Lectures** are given throughout the Winter and Summer Sessions by the Physicians and by the Surgeons at twelve o'clock. (See Time Table, page 26.)

**Post Mortem Examinations** are conducted and Pathological Demonstrations given by the Pathologist at two o'clock.

### SPECIAL DEPARTMENTS.

In these departments instruction is given in the use of the various instruments and appliances special to each.

**Diseases of Women.**—Dr. Aust Lawrence visits on Wednesdays at eleven o'clock, and gives Clinical Instruction in the Diseases peculiar to Women.

**Diseases of the Skin.**—Patients affected with Skin Diseases are seen by Dr. Harrison at one o'clock on Tuesdays and Fridays.

**Diseases of the Eye.**—In this Department Ophthalmic cases are seen on Tuesdays and Fridays at one o'clock.

**Diseases of the Ear.**—Patients are seen on Mondays at twelve o'clock, by Mr. Pickering.

**Diseases of the Throat.**—Dr. Barclay Baron sees patients affected with Diseases of the Throat on Mondays and Thursdays at one o'clock.

**Diseases of Children.**—In addition to the special Children's ward in the Hospital, the Out-patient department affords abundant material for the study of the Diseases of Children.

**Dental Surgery.**—Mr. Parson attends on Mondays and Thursdays at eleven o'clock, and gives practical instruction in Dental Surgery.

## PRACTICAL PHARMACY.

Instruction in Practical Pharmacy is given to Students on payment of a Laboratory fee to the Hospital.

## CLINICAL CLERKS, DRESSERS, AND RESIDENT PUPILS.

**Clinical Clerks.**—While ordinary pupils enter to the general practice and accompany the Physicians on their usual visits, Students who become Clinical Clerks, besides this, place themselves under one Physician, from whom they receive special instruction in the practice of Medicine. The Clinical Clerks alone have the privilege of recording cases and visiting the wards by themselves.

**Dressers** reside in the Hospital by rotation and free of expense. They have the privilege of dressing the cases in the wards, and of attending the minor casualties, and also the severe accidents, under the direction of the House Surgeon.

**Obstetric Clerks.**—Students can enter as Obstetric Clerks, under the Physician Accoucheur, for periods of three months.

**Dressers to the Eye and Ear Departments** respectively are appointed from amongst the Students of the Hospital, for periods of three months, without payment of fee.

## FEE.

	Six Months.	One Year.	Perpetual.
Medical Practice ... ..	£6	£10	£20
Surgical Practice ... ..	6	10	20
Medical and Surgical Practice } together in one payment ... }	... ..	... ..	35 Guineas.

*The above Fees include Clinical Lectures.*

Clinical Clerkship ... ..	5 Guineas for six months.
Dressership ... ..	5 Guineas for six months.
Obstetric Clerkship ... ..	3 Guineas for three months.
Library Fee ... ..	1 Guinea on entrance.

*All Fees are paid to the Secretary, at the Hospital.*

# BRISTOL GENERAL HOSPITAL.

## TIME TABLE OF CLINICAL INSTRUCTION.

	MONDAY.	TUESDAY.	WEDNESDAY.	THURSDAY.	FRIDAY.	SATURDAY.
VISITS TO WARDS— PHYSICIANS .. ..	1 p.m. Dr. Markham Skerritt.	2 p.m. Dr. Harrison. Dr. Baron.	2 p.m. Dr. Markham Skerritt.	2 p.m. Dr. Baron.	1 p.m. Dr. Markham Skerritt. Dr. Harrison.	2 p.m. Dr. Baron.
VISITS TO WARDS— SURGEONS .. ..	1.30 p.m. The Surgeon for the week.	1.30 p.m. Mr. Lansdown. Mr. Dobson	1.30 p.m. Mr. Pickering. Mr. Penny.	1.30 p.m. The Surgeon for the week.	1.30 p.m. Mr. Lansdown. Mr. Dobson.	1.30 p.m. Mr. Pickering. Mr. Penny.
OPERATIONS .. ..	<i>Ophthalmic</i> , 1.30 p.m.			1.30 p.m.		
MEDICAL OUT-PATIENTS	1 p.m. Dr. Clarke.	1 p.m. Dr. Harrison. Dr. Baron.	1 p.m. Dr. Markham Skerritt.	Dr. Clarke.	1 p.m. Dr. Harrison.	1 p.m. Dr. Baron. Dr. Clarke.
SURGICAL OUT-PATIENTS	1 p.m. The Surgeon for the week.	1 p.m. Mr. Lansdown. Mr. Dobson.	1 p.m. Mr. Pickering. Mr. Penny.	1 p.m. The Surgeon for the week.	1 p.m. Mr. Lansdown. Mr. Dobson.	1 p.m. Mr. Pickering. Mr. Penny.
CLINICAL LECTURES .. At 12 noon.	<i>Surgical</i> — Mr. Penny.	<i>Medical</i> — Dr. Harrison. <i>Surgical</i> — Mr. Lansdown.	<i>Medical</i> — Dr. Markham Skerritt <i>Surgical</i> — Mr. Pickering.	<i>Medical</i> — Dr. Baron.	<i>Surgical</i> — Mr. Dobson.	<i>Medical</i> — Dr. Clarke.
DISEASES OF WOMEN..			11 a.m. Dr. Aust Lawrence.			
DISEASES OF THE SKIN		1 p.m. Dr. Harrison.			1 p.m. Dr. Harrison.	
DISEASES OF THE EYE		1 p.m.			1 p.m.	
DISEASES OF THE EAR	12 noon. Mr. Pickering.					
DISEASES OF THE THROAT	1 p.m. Dr. Baron.			1 p.m. Dr. Baron.		1 p.m.
DENTAL SURGERY ..	11 a.m. Mr. Parson.			11 a.m. Mr. Parson.		

## RECENT PRIZEMEN

AT THE

MEDICAL SCHOOL, THE ROYAL INFIRMARY, AND THE  
GENERAL HOSPITAL.

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| <p>Aubrey, A. R., 1882.<br/>Baker, T. R., 1884.<br/>Barclay, W. M., 1883, '84, '85<br/>and '86.<br/>Barker, G. H., 1884, '86, and '87.<br/>Barker, W. J. T., 1881, '82, '83,<br/>and '84.<br/>Baskett, B. G. M., 1887 and '88.<br/>Belfield, C. W., 1872 and '73.<br/>Benham, W. T., 1868, '69, and<br/>'70.<br/>Bergin, G. F., 1887 and '88.<br/>Birch, De B., 1873 and '74.<br/>Blacker, E., 1876.<br/>Boissier, A. H., 1877 and '78.<br/>Burleigh, H. A., 1885.<br/>Bush, J. P., 1880 and '81.<br/>Capron, H. J., 1882, '84, and '86.<br/>Carter, T. M., 1888.<br/>Chute, H. M., 1868, '69, and '70.<br/>Cripps, C. C., 1875.<br/>Cunningham, A. G., 1880.<br/>Day, W. A., 1877.<br/>Devis, H. F., 1884 and '87.<br/>Evans, C. E., 1883.<br/>Fardon, J. H., 1885 and '86.<br/>Fendick, R. W., 1872.<br/>FitzGerald, C., 1869.<br/>Flemming, C. E. S., 1884 and<br/>'85.<br/>Francis, W. H., 1878 and '80.<br/>Glasson, C. J., 1883.<br/>Gray, A. M., 1884.<br/>Grey, J. T., 1886 and '88.<br/>Grey, T. C., 1886, '87, and '88.<br/>Guy, J. R., 1875.<br/>Hall, E. G., 1886 and '87.<br/>Hamilton, H., 1884 and '85.<br/>Heaven, J. C., 1876.<br/>Henderson, C., 1874, '76, and '77.<br/>Herapath, C. K. C., 1871 and '73.<br/>Hill, Hedley, 1886, '87, and '88.</p> | <p>Hodges, W., 1869.<br/>Hughes, E. A., 1882.<br/>Husband, H. W., 1884.<br/>Jackson, H. S., 1887.<br/>Jefferies, J. E., 1880.<br/>Jenkins, J., 1881.<br/>Jones, C. C., 1875.<br/>Jones, F. F., 1884 and '85.<br/>Jones, W. A., 1881.<br/>Joseph, A. H., 1883, '84, and '86.<br/>Kiddle, I., 1881.<br/>King, A. J., 1869.<br/>Knapp, E. M., 1876.<br/>Lace, F., 1885.<br/>Lawrence, A. E. A., 1870 and '71.<br/>Leicester, M. E., 1886.<br/>Little, A. N., 1881, '82, '83, and<br/>'85.<br/>Logan, F. T. B., 1877, '78, and<br/>'79.<br/>Lysaght, W. C., 1881 and '85.<br/>Mackenzie, J., 1871.<br/>Marks, R. J., 1885, '86, and '87.<br/>Marsh, T. A. P., 1877, '78, '79,<br/>and '80.<br/>Marsh, W. G. H. B., 1875.<br/>Marshall, L. W., 1869 and '70.<br/>Massiah, B. J., 1871, '72, and '73.<br/>Meaden, C., 1885.<br/>Meaden, E. H., 1882.<br/>Mole, H. F., 1886.<br/>Molesworth, W., 1886 and '87.<br/>Morgan, S. W., 1885, '86, and<br/>'88.<br/>Morton, F., 1878 and '83.<br/>Myles, G. T., 1880.<br/>Myles, J. P., 1880 and '81.<br/>Newman, C., 1872, '73, and '74.<br/>Norton, T. C., 1876 and '74.<br/>Openshaw, E. H., 1887.<br/>Ord, W. T., 1882.<br/>Ormerod, H. L., 1888.</p> |
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- Palmer, F. C., 1874.  
 Parker, A. F., 1874.  
 Parry, J. H., 1877.  
 Parsons, J. H., 1888.  
 Pauli, E. H. C., 1888.  
 Peake, A. W., 1888.  
 Peck, F. S., 1878.  
 Penruddocke, C., 1878.  
 Pocock, H. I., 1883 and '86.  
 Prichard, A. W., 1870, '71, '72,  
 and '73.  
 Prockter, A. E., 1869.  
 Rankin, L. K., 1881.  
 Richards, T., 1883 and '84.  
 Riddell, A. W., 1886.  
 Roberts, K., 1887 and '88.  
 Roué, W. B., 1878 and '79.  
 Rudge, C. K., 1878.  
 Rudge, H. T., 1880, '81, and '82.  
 Salmon, L. E. A., 1879, '80, 81,  
 and '82.  
 Semple, H. F., 1885 and '86.  
 Simmons, H., 1882.  
 Smith, G. M., 1876, '77, and '78.  
 Stevens, F. G., 1872 and '74.  
 Stevens, W. E., 1886.  
 Stiles, T. M., 1884, '85, '86, and  
 '87.  
 Sturge, W. A., 1869 and '70.  
 Swayne, W. C., 1882 and '85.  
 Taylor, F., 1875.  
 Taylor, J., 1874 and '75.  
 Thomas, J. M. M., 1888.  
 Thorold, W. G., 1882, '83, and  
 '84.  
 Thurston, H. C., 1881, '82, and  
 '83.  
 Tomkins, A. J., 1882, '83, '84,  
 and '85.  
 Tomkins, H. H., 1880, '82, & '83.  
 Trask, J. E., 1884 and '85.  
 Tratman, F., 1879, '80, 81, and  
 '84.  
 Trevelyan, B. R. T., 1884 and '87.  
 Visger, H., 1879.  
 Waldo, H., 1870.  
 Ware, W. H., 1885.  
 Watkins, W. J., 1887 and '88.  
 Weatherly, L. A., 1872.  
 Webb, J. B., 1885.  
 Weir, F. W., 1880, '82, and '84.  
 Wheeler, W. H., 1878.  
 Whitfield, W. J. C., 1872 and '76.  
 Williams, L. H., 1883 and '86.  
 Williams, W. R., 1872 and '76.  
 Williams, P. W., 1881, '82, '83,  
 and '84.  
 Windsor-Aubrey, H. W., 1880,  
 '81, and '83.  
 Wintle, C., 1888.  
 Young, A. S. W., 1874.  
 Young, C. L., 1877.
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LIST OF SCHOLARSHIPS, PRIZES,  
AND  
CERTIFICATES OF HONOUR  
FOR THE YEAR 1888-89.

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MEDICAL SCHOOL.

SUMMER SESSION.

<i>Chemistry</i> ... ..	{ Prize, V. Moxey. Certificates, T. M. Carter, H. B. Wilson, E. A. Duffield, C. W. J. Brasher, and J. Freeman.
<i>Practical Chemistry</i> ... ..	{ Prize, H. B. Wilson. Certificates, T. M. Carter, V. Moxey, and J. Freeman.
<i>Botany</i> ... ..	Prize, H. B. Wilson.
<i>Practical Physiology and Histology</i>	{ Prize, A. W. Peake. Certificates, E. G. C. F. Atchley, H. B. Wilson, T. M. Carter, and J. H. Parsons.
<i>Materia Medica and Therapeutics</i>	{ Prize, A. W. Peake. Certificates, T. M. Carter, J. Freeman, and V. Moxey.
<i>Obstetric Medicine</i> ... ..	{ Prize, F. H. Edgeworth. Certificate, B. G. M. Baskett.
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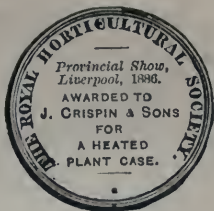
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